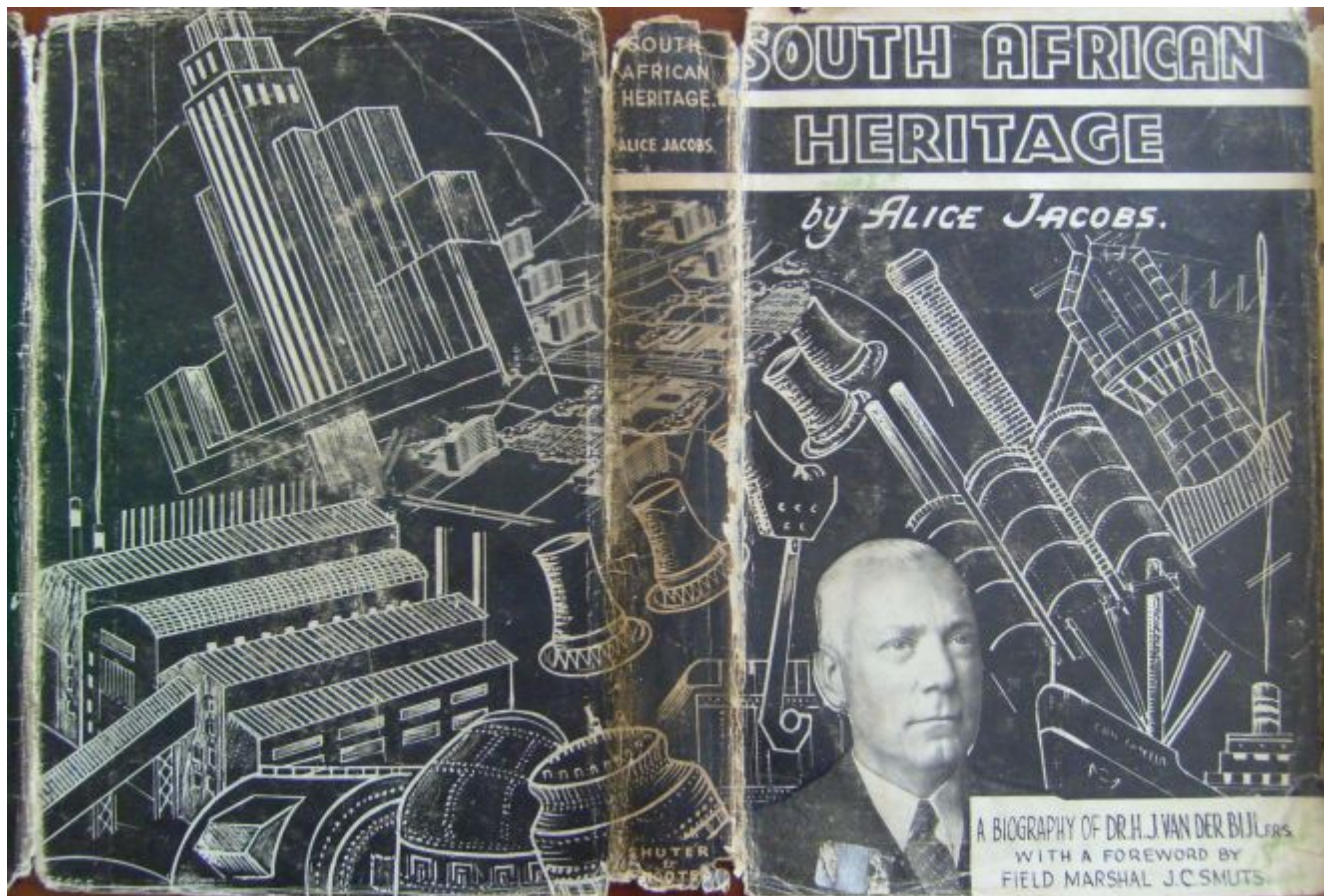




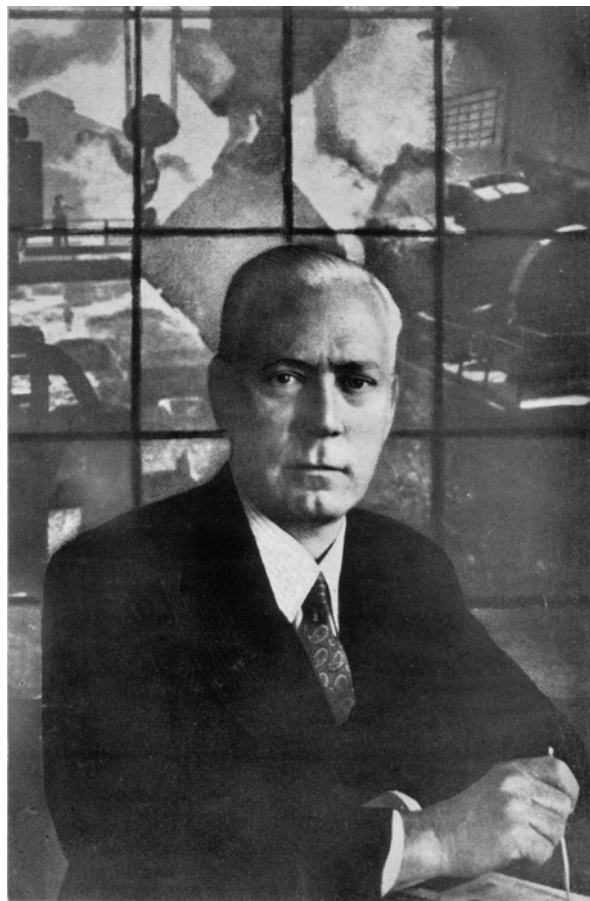
SOUTH
AFRICAN
HERITAGE.

ALICE JACOBS.

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by ALICE JACOBS.

A BIOGRAPHY OF DR. H. J. VAN DER BIJL.
WITH A FOREWORD BY
FIELD MARSHAL J. C. SMUTS.



SOUTH AFRICAN HERITAGE

A BIOGRAPHY

OF

H. J. VAN DER BIJL

BY

ALICE JACOBS

Pietermaritzburg: Shuter & Shooter.

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To E.J.

CARRY ON

WHEN the manuscript for this book was completed some six months ago, Dr. van der Bijl was, apparently, still in vigorous health and was busy completing the plans for the incorporation of the Victoria Falls and Transvaal Power Company into the Electricity Supply Commission. He was anxious that the merging of these two big concerns should go without a hitch and that as little inconvenience as possible would be caused to any of the employees. He was intensely pleased and proud when his loan for fifteen million pounds was fully subscribed in a few hours - it was a vote of confidence in him and in Escom which he valued beyond praise.

In addition he was planning a new financial company called Bylcos Investment Corporation, and his dream was that this corporation would finance, among other schemes, his plans for a ship-building industry in South Africa.

He was delighted with the progress of his dream city. "Vanderbijl Park", and proud to see

outside capital and industrialists being attracted to it. How often he had said: "This must not be just an Iscor preserve; it must be an industrial city providing avenues of employment as the gold mines dwindle. That is the only solution to the poverty of the majority of our people - it is the only sure way of raising the standard of living for all - black and white. Provide work and beautiful surroundings and you will see that the spirit of South Africa is still proud and strong and able to overcome all the difficulties which beset its path. "Among the many memorials he has left in South Africa this was nearest to his heart, and he had already designed the home he planned to build at Vanderbijl Park and had resolved to give more and more of his time to the problems and progress of his "city of ideas and ideals".

He had always promised that, one day, he would really give me some time and would tell me more about himself. His absence from Johannesburg for long periods, when the book was first drafted, made it difficult to make it

otherwise than a factual recording of achievements, Knowing and loving him, as we all did, I could only weave from his papers the story of his life. As usual, he had little time and not much interest in anything which he did not consider constructive. He had to be building: anything else was just a chore to be disposed of as quickly as possible. He read the manuscript in hospital while waiting for the medical verdict on the illness, which none of us then dreamed would cause his death. He laughed when he had finished it, and said: "It is far too complimentary, but you have got the facts straight."

Fortunately, he never knew that his illness was incurable and with his usual determination, only six weeks after the operation, in spite of failing strength and ever-mounting pain, went off to England to complete personally the last of the negotiations necessary to round off the V.F.P. transfer. On his return to the Union he still hoped that his recovery was not far off and kept seeing "his boys," giving them advice and ever pointing the way onward.

Death came as a happy release on the 2nd December, 1948, and could he have known the wave of love and sadness his going has caused and have seen the letters we have received, he would have been well content. They are not just expressions of sympathy: deep and unashamed love shines from all of them. It was indeed a privilege to have known him.

To his men, who will feel lost and desperate in the days ahead and who will long with all their hearts for "just ten minutes with the Chief, please," I can only pass on his message which, when he realized at last that Death was winning this last big fight, was simply: "Carry on."

FOREWORD

By

Field-Marshal the Rt. Hon. J. C. SMUTS,
P.C., C.H., K.C., D.T.D., F.R.S.

South Africa has often been called the land of romance. This is a tribute to its colourful history, its political developments, and its surprising mineral discoveries, which have publicized South Africa as a land of gold and diamonds, and a happy hunting ground for those in search of new fortunes. In such a new environment surprising events have happened and men have arisen whose deeds and personalities have attracted world-wide attention. It has presented the picture of a young country on the march, with a vivid story, with romantic developments in peace and war, and with an intriguing destiny before it. Remarkable and picturesque men have emerged in such a setting - some of them native-born, and some adventurers from other lands, attracted by its sunshine or by the prizes which it had to offer.

This book deals with the career of one of the native-born South Africans, whose amazing achievement calls for a written record such as is contained in this book. Among South Africans Dr. van der Bijl does not follow the usual pattern of a warrior, or a statesman, or a financier. His record is that of a scientist, and especially of an industrial organizer in war and in peace, of whom South Africa has produced no equal. In that respect he is a new phenomenon in the personal record of South Africa. But no less than the other great figures in its public life he has laid and is laying the foundations of the new South Africa, now emerging on the world scene.

This book tells of his modest beginnings in the old sleepy South Africa of the nineteenth century, near its close. It tells the story of his early education at my old beloved Victoria College, now the University of Stellenbosch, and of his further education in Germany, where he distinguished himself by striking original work in the most recent electrical scientific

developments. This again led to his employment by big electrical enterprises in the United States of America, where his researches and discoveries made him the leading authority for many years on the Thermionic Vacuum Tube, which was the foundation of long-distance telephony. At the height of this career as a scientist I called him back to South Africa, where, as Prime Minister after the first World War, I wanted him back as scientific and technical adviser to the Government, and ultimately to head a public utility corporation for generating electrical power on a nation-wide non-profit basis. To this appeal he responded and in due course became chairman of Escom, the Electricity Supply Commission, which is today supplying South African industry and other users with probably as cheap power as is to be found anywhere in the world.

About that time the prospects were also being explored of producing iron and steel on a large scale as the basis of a heavy industry for the future. And when this project was later

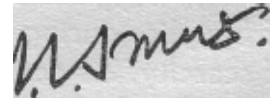
successfully launched by my successors in the Government of the country, Dr. van der Bijl became also the chairman of the Iron and Steel Corporation (IsCOR), another great public utility corporation providing industry with iron and steel as raw material.

Under his able leadership these two great enterprises have laid the basis of industrial South Africa, and their remarkable success has been largely due to his technical and administrative genius. His early record as a scientific researcher was thus more than equalled by his capacity as a large-scale industrial organiser.

Nor does the story end there. When the second World War came to South Africa, and the country was confronted with the immense new task of organising itself industrially for war purposes, I inevitably selected Dr. van der Bijl as leader of this new task. As Director-General of War Supplies, and later as Director-General of Supplies during the war and post-war period of scarcity, his genius shone at its brightest,

and he rendered a service on the economic plane to his country and to the world, such as no other South African could have equalled, and such as places him among the foremost South Africans of this tremendous period. Isolated by the submarine warfare and transport difficulties from world supplies, South Africa had to depend on her own resources. Iscor had to be expanded, and engineering establishments dependent on it had to be built or enlarged. All this was done under his inspiring leadership, and incidentally the foundations were thus laid of the South African heavy industry of the future. Power and steel and engineering enterprise, largely concentrated in the neighbourhood of Vereeniging, and the new steelworks and heavy engineering and allied industries rapidly growing in the adjoining town, suitably bearing the name of Vanderbijl Park, are making this district today the future Birmingham of South Africa.

Such is the record up to date. It is a good story, a proud story of constructive achievement, and in this biography the story is told. I gladly introduce it to the public, and as an old friend and comrade of Dr. van der Bijl, welcome this opportunity of once more paying my tribute to this outstanding son of South Africa, whose services are second to none, and have contributed greatly to the enrichment of South Africa and to its stature in the world.

A handwritten signature in dark ink, appearing to read 'W. J. van der Bijl', is written on a light-colored, textured surface.

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AUTHOR'S PREFACE

Many books have been written about South Africa and about the men who have moulded her political history. This, too, is about South Africa - it is the story of a great South African scientist and industrialist - Hendrik Johannes van der Bijl.

The story of the bitter mutual hatred of Paul Kruger and Cecil John Rhodes has often been told, and the association of Rhodes and General Smuts is ancient history, but little is known of the friendship of General Smuts and Dr. van der Bijl, or of the effect this friendship was to have on South Africa.

It would seem that this sunny land grants to her ablest sons a simplicity of heart and abiding love for their country, for the lives of our really great South Africans show them always as simple folk, plodding staunchly on towards their goal, quite unimpressed by wealth or the frills of luxurious living. Dr. van der Bijl is no exception - he has always remained a simple

man, shunning the limelight and asking only to be left in peace to work. He might well be called the man who by sheer force of will and hard work has made his dreams come true. His dreams are for South Africa's industrial future. He has no desire for the wielding of personal power, no love or patience with politics, but a burning desire to see South Africa established as a first-class industrial power. He is probably unique as an industrialist whose motives are totally unconcerned with the making of personal profits or the amassing of a private fortune, yet the capital assets of the industries he has created and built up are now nearing the £100 million mark. His influence on the industrial life of the Union has indeed been so great that his story is virtually the story of South Africa for the past generation.

SOUTH AFRICAN HERITAGE

CHAPTER 1 ANOTHER DREAM COMES TRUE

*“So soon the child a youth; the youth a man;
Eager to run the race his father ran.”*

- ROGERS.

ON a blustery August day in 1943, a white haired man, with an incredibly fresh young face, sat waiting in his study - waiting for news of the birth of his first child. Would it be a son? Could it be possible that yet another of his dreams, perhaps the dearest of all, was about to come true.

At this time Dr. H.J. van der Bijl was already in his fifties, yet his fresh-complexioned, good-looking face and erect carriage, with the still clear cut lines of youth, belied the years. His whole appearance was one of health and vigour.

As he waited, he tried to plan for the future and resolved to give this coming child everything in the world. He would smooth the path of this new little soul and help him to mould a fine, sturdy character. Later, he would take him fishing, teach him to swim - visions of a small boy plodding by his side across a sun washed beach made him smile. He saw himself buying electric trains, tricycles and footballs. What fun they would have.

Soon his well-trained mind, so used to planning and scheming ahead, refused to dwell on the future, and, instead, turned back to thoughts of his own childhood and the story he had often been told of the night of his own birth. There had been a raging storm which, after days of soaking rains, had caused one of the walls of the little Pretoria house where his parents lived, to collapse and amid the ensuing confusion, rolling thunder and vivid flashes of lightning, he had come into the world. With due apologies to Shakespeare, it might well have been said of that night that “the Heavens

themselves blazed forth the birth of greatness.” He was the fifth child of his parents, who little dreamed that stormy night that the baby son who had arrived amid such confusion, would one day do so much to change the face of South Africa. To them he was just another baby, another little boy to be clothed, fed and educated.

Thinking back to his mother gave him comfort - she had had eight children and lived to rear them all. The waiting is over at last. All is well, and yet another dream is added to the list of dreams that came true and there is another little Hendrik Johannes van der Bijl in the world. A very small one, but ridiculously like his father. The same square hands, the same long upper lip and humorous mouth, even the same well-shaped head. Only the eyes are his mother’s.

Will this little fellow ever realize his inheritance and appreciate the saga of effort, the intricate planning and the burden of work which his father - this simple, unpretentious

man - has borne in order to get South Africa started on her industrial career. How proud this little chap should one day be when he realizes the debt that he and all South Africans owe to his father. That will be many years from now - in the interval he will just be “Dad,” a good chap who is always providing new and interesting playthings and who is always ready for a romp.

In the years that followed two little sisters were to join the family circle - happy little play-fellows making life for young Hendrik very entrancing, but causing such noise and confusion that Hendrik senior begins to wonder if it would not be as well to have the walls of his study made sound-proof, for he is still working and planning and the noise of three healthy children is hardly conducive to the concentration he has been wont to apply to his work.



SKETCHING IS EASY WHEN DAD LENDS A HAND.
H.J. and his son, 1946.

With acknowledgments to "Fleur".

The little Pretoria house where the collapsing wall and mud-soaked floors had caused such confusion on the night of his birth, the 23rd November, 1887, is still standing in Visagie Street, almost buried now in the growth of the surrounding town. This small white-gabled house with its mud floors was only a temporary home, and some few months after Hendrik's birth the van der Bijl family moved to a larger house also in Visagie Street. Later Hendrik's father, Pieter Gerhard van der Bijl, built for his family a home in Sunnyside, at that time an outlying suburb of Pretoria, which he named "Constantia Villa." Today the miles of open veld which once surrounded "Constantia Villa" are closely built up and the house itself, like so many of the large roomy old houses built by our early pioneers, has been turned into a boarding house.

In those early days Pretoria was in the grip of a housing shortage (what familiar words these are today) and it was to "Constantia Villa" that the late General Hertzog, a close friend of the

van der Bijl family and, at that time, a rising young barrister, brought his bride, and the couple lived at "Constantia Villa" until they were able to obtain a home of their own.

At the time of Hendrik's birth, South Africa was in a turmoil. The two Republics of the Orange Free State and the Transvaal were all but bankrupt. The prosperous days of the Cape were almost over - the opening of the Suez Canal having short-circuited the Cape's usefulness. The discovery of diamonds and gold was already changing the face of the land and the year of his birth, 1887, saw the gold rush to Johannesburg and the proclamation of the Witwatersrand Goldfields. President Kruger had just entered his third term of office and feelings were still running high between the English and the Boers. The annexation of the Transvaal by the British ten years earlier, their subsequent defeat at Majuba, followed by the return of the Republic to the Boers four years later, had caused a good deal of bitterness and ill-feeling on both sides. The shadow of Cecil

John Rhodes was beginning to spread throughout South Africa and the seeds had already been sown for the historic battle between the old Voortrekker leader, President Kruger, and the “Colossus” Rhodes: that bitter battle which was to culminate in the Boer War and leave scars of hatred down to the present day.

To most South Africans the early history of this vast and fabulous land must seem a sorry tale fraught as it is with misery, mistakes, misunderstanding and hatred. Perhaps it is still too young a land to get a fair perspective and hundreds of years hence the story of the bungling, racial hatred and abuse of our great gifts, may read differently and our early squabbles, which have received so much publicity, may appear unimportant and trivial in the general scheme.

This is a land made up essentially of individualists, too near their origin to take kindly to discipline or regimentation, with strong emotions, nursing hatred and resenting any restriction of their personal liberties. The early

settlers were almost entirely men and women of exceptionally strong character, rebels against tyranny, adventurers and explorers, ready to sacrifice everything they had for the sake of freedom and fortune. Freedom to live, love, worship and fight as they chose. Fortune to give them power and ease. Their way of life was hard; building up a new existence under difficult and sometimes terrifying conditions and then, when oppression and interference still followed, they would start out yet again trekking into the interior of an unknown savage land, sacrificing their lives and facing violent and cruel deaths, all in the name of freedom. No wonder the descendants of these people are difficult to handle.

The parents of our Hendrik Johannes van der Bijl were no exception. They too were typical South Africans, fine sturdy, independent characters. His father, Pieter Gerhard, was the seventh generation of the van der Bijl family to be born in South Africa, the first of the line,

Gerrit van der Bijl, having landed at the Cape from Holland in 1664.

The young Pieter Gerhard showed his independent spirit at a very early age. His parents owned a farm called "Schoongezicht" at Stellenbosch, where they carried on the extensive cultivation of grape vines. Young Pieter at the age of 15 was assigned the task of supervising and assisting the coloured workers in the fields. This certainly did not appeal to the ambitious lad, so one day he decided to set out and seek his own fortune and, with the princely sum of 15/- in his pocket, left home and went to Paarl. His father, expecting the speedy return of a weary and contrite son, decided to allow time and disillusionment to teach this independent boy a good lesson. Much to the family's surprise, however, young Pieter, instead of the expected humble return to the fold, immediately began to prosper. He possessed a very good business head and a tremendous capacity for work - characteristics which were to appear again to a marked degree in his son Hendrik.



Starting in a small way he began transport riding between Paarl and Kimberley and soon accumulated sufficient capital to purchase an hotel in Boshof. Here later he met and married Hester Groenewald, after whose father, Hendrik Johannes Groenewald, our Hendrik Johannes was named.

In Boshof, Pieter Gerhard and his Hester lived very happily together building up their hotel business and raising a family, and it was in Boshof that four of their eight children were born.

Some months before Hendrik's birth, Pieter and his wife decided to sell the hotel and seek their fortunes in Pretoria. Undaunted, they set off in their bullock wagons with their four small children - the youngest little girl not yet two years old. The journey was hard and the going rough, but the two young people had plenty of courage and eventually arrived in Pretoria at the end of July, 1887, just four months before Hendrik's birth.

With one of these same bullock wagons which had brought them safely to the dusty, straggling little capital of the Transvaal Republic, P.G. could have made, almost overnight, the fortune he had set out to seek. In those days wagons and spans of oxen were literally more precious than gold, and far harder to come by, and soon after their arrival in Pretoria one desperate settler offered P.G. a farm in exchange for one wagon and a span of oxen. P.G. went off to investigate the bargain but decided that the land offered was quite useless for farming so refused the offer. The farm was Maraisburg, where only a year later gold was discovered!

In Pretoria, Pieter Gerhard soon began to prosper. He built up a successful business as a produce merchant, invested in property and, as the years went by, became well established in the fast-growing town, becoming a deacon and elder of the Church and a tower of strength on the church council, where his business ability and talent for finance were a great asset. Many a chat and argument P.G. had with old President

Kruger, and among his many friends were such well known South Africans as Louis Botha, Jan Smuts and Barry Hertzog.

Hendrik, never a sturdy child, all but died when he was about two years old. The family caught an infection then known as black measles. First the mother fell ill, then Hendrik and his sister Hester, two years his senior. The babies were so ill that the harassed doctor decided they were beyond his help and concentrated on saving the mother's life. But the future was not to be cheated, and much to the astonishment of everybody the two wasted little bodies continued to cling to life until gradually the fever passed and strength slowly returned.

At a very early age, Hendrik proved to be a very serious little fellow and liked to spend long hours by himself working out his childish problems. He wanted to know everything and would fly into a tantrum if disturbed by the other children until they early learned to leave their small brother, Hendrik, well alone if he were absorbed in his own little problems. He

had inherited in full measure the independent spirit of his ancestors and early asserted his right to his own opinions. At six years of age he was sent off to school with the other children, duly scrubbed and polished for the occasion, but returned home full of indignation, asserting that he would not go back to school to be taught by "girls." He was a boy and wanted to go to a real boys' school and be taught properly by men.

Hendrik's mother and father must have wondered then, as they were to wonder many times as the years went by, what would become of this funny, determined and, to their way of thinking, far too serious little fellow. He was so different from his brothers and sisters and so very persistent. However, on this occasion, they complied with the child's wishes and sent him to another school. This was the Model School which some years later was to be used as a camp for prisoners of war during the Boer War. It was here that Winston Churchill was taken

when he was captured and from this same school house that he made his escape.

C H A P T E R 2

THE MOULDING OF THE CLAY

IT is a widely accepted belief that the mould which shapes the pliable clay of character is cast in early childhood, and the ideas and ideals implanted in a young mind form throughout life the basic behaviour pattern which, consciously or unconsciously, governs all thought and action.

The early influence of his father on the mind of the young Hendrik probably accounts for the surprising decision he was to make in later years when he abandoned his scientific career in America and accepted General Smuts's invitation to return to the Union and to start out in an entirely different direction. Even today one of the questions most frequently asked of H.J. - or "the Doctor" as he is usually called - is why, at the height of such an exceptionally promising career and in the prime of his youth,

with all his future before him, he elected to change his course and return to South Africa, sacrificing an already established world famous reputation and bidding good-bye to the honours he had already won and would most certainly have continued to win in the world of science, in order to undertake the difficult and often thankless and heartbreaking task of trying to get the foundations of South African industry well and truly laid.

He must have known in his heart that the world is very lavish with her praise and honours when she is dealing with her scientists, writers or fighters, but the honest, hard-working industrialist is sure of only one thing - criticism. Yet he always maintained that he never regretted his decision.

At the time, most of the world's leading scientists, knowing the value of his research work and discoveries, considered his decision as little short of madness - a piece of quixotic, sentimental parochialism. One of them - Lord Rutherford - then already working on the

possibility of splitting the atom, summed up the general feeling by remarking, "Man alive, you are nothing short of a fool to go burying yourself in an out-of-the-way place like South Africa."

In the scientific and economic world of that time, South Africa was considered an unimportant back-water, a half-civilized land fit only for savages and farmers! But to Hendrik Johannes van der Bijl it was the land of his birth and the cradle of his dreams, and perhaps he himself hardly realized the origin or power of the force that was pulling him back.

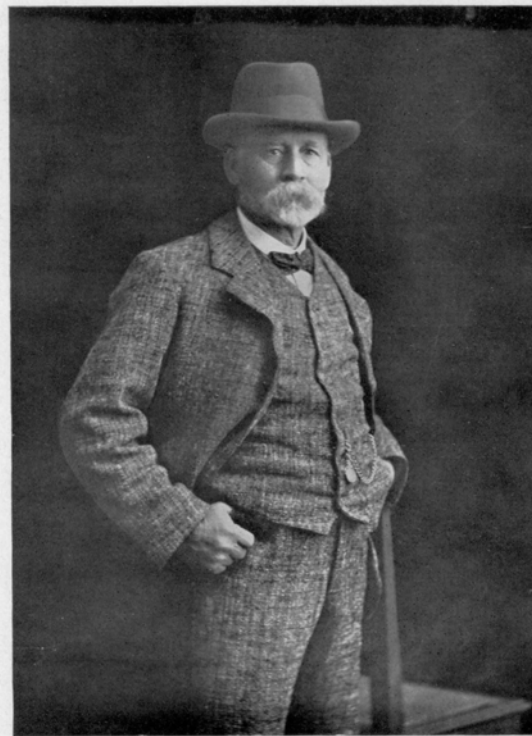
This force was surely the love and faith in his country which had been implanted in him by his father. Pieter Gerhard van der Bijl had a deep and abiding faith in South Africa and dreamed even then of its becoming an industrial power in the world.

As a child young Hendrik would spend long hours listening to his father's opinions on the necessity for developing this wonderful land

about them; the resources provided by the Almighty were all but limitless and, with an equally resourceful people, the future could be made not a fantastic dream but a glorious reality. Father van der Bijl was a rugged individualist and had no patience with people who maintained that there was anything which could not be made in South Africa or that, as was the general opinion at that time, any article made in South Africa was of necessity inferior to an imported article merely because it had originated in South Africa. Such talk, in his opinion, was sheer nonsense and an excuse for laziness and slovenly work. He disagreed emphatically with the then popular and widely credited theory that climatic conditions made it impossible to weave South African wool into a satisfactory cloth. To disprove the theory he actually had a suit of clothes made from material spun from wool sheared from his own sheep. The material was scratchy and coarse but P.G. wore the suit with great pride and satisfaction, and even had a photograph taken of himself wearing the famous outfit.



H. J.'S FATHER AND MOTHER.



P. G. VAN DER BIJL IN HIS FAMOUS HOME-SPUN SUIT.

Memories of his father are still very vivid to H.J. His manner of stressing a point, his business-like methods and the despatch with which he carried out his plans, coupled with his ability to make quick decisions and to think ahead strongly impressed his young son.

In carrying out his business as a grain merchant, P.G.'s method was to travel around the Transvaal and Northern Free State visiting the various farms. He would then go out into the lands with the farmer, assess the value of the standing crops and make an outright offer, paying cash then and there should his offer be accepted. Later he would arrange for transport and sale of the crop direct to the purchaser. Whenever possible he would take the young, impressionable and very studious little Hendrik with him on his travels, showing the child with loving pride the possibilities inherent in the land about them. He took him to Pretoria's small printing works to show him the first linotype machine being installed. Strangely enough this was at the works of the Caxton

Printing Company, which some 50 years later was to pass into the boy's possession and to blossom under his hand into a grand new printing and publishing works, but still with the same old name.

Later father and son visited the first South African glass works, and still later young Hendrik was shown the first carving knife made entirely from steel smelted in South Africa. Thus were the roots of the growing sapling driven deeper and deeper into the soil of South Africa.

Although they were so much together old P.G. never had a very high opinion of the studious little Hendrik. The other children were so much more boisterous and this quiet bookish little fellow, never very sturdy, seemed somehow too old for his years. Nevertheless P.G. had great confidence in the child's ability and made a practice of teaching him the routine business procedure. At this time P.G. owned a number of houses in Pretoria, and he invariably took Hendrik along on his rent-

collecting journeys, teaching the youngster how to make up the rent in the tenant's book, give receipts and later enter up the proceeds in the books at home, before banking the money received. At one time P.G. found himself obliged to be away from Pretoria at the month-end and charged the 12-year-old Hendrik with the rent collecting, impressing on the child that as his mother was very nervous and worried over the possibility of burglary, he was to be sure not to keep any of the money in the house but was to collect the rents, make the entries and deposit the money before the banks closed at three o'clock.

When the time came, young Hendrik set out importantly on his mission and returned with his pants' pockets bulging with notes and gold and silver coin. He had collected over £200. Arriving home he entered up all the rents in the book, balancing the totals as he had been taught to do and carefully checking and rechecking. All was in order but it was well past three o'clock and it was too late to get the

money into the bank. Fortunately P.G. had a strong safe in the house so the child locked up the money and, putting the key carefully under his pillow, bore the burden of his responsibility quite alone, never mentioning to his nervous mother that the house held such a large sum of money. Yet the temptation to share his anxiety even at the expense of worrying his mother was very great, and the youngster kept finding himself on the verge of confession. Fortunately, his determination not to worry his mother won the day and next morning saw a heavy-eyed young Hendrik waiting impatiently for the bank to open. The relief he felt when the money was at last deposited can well be imagined.

In later years an older and wiser Hendrik often recalled this incident and maintained that it taught him not to worry needlessly or anticipate trouble. The boy Hendrik had dreaded his father's return, not knowing quite how his story would be received. The elder van der Bijl listened in silence to his son's tale, then he got out the books and deposit slips and checked all

the figures carefully. On finding everything in order and the money correct to the last penny, he handed the boy three golden sovereigns. This was the first money young Hendrik had ever earned, and what wealth it seemed to him. For days he planned how he would dispose of this vast fortune and eventually invested most of it in stamps and books - his two ruling passions at that time.

The year of the Jameson Raid - 1895 - Hendrik was eight years old, but he still remembers the feeling of tension and the preparations in Pretoria. His father became a Field-Cornet and was responsible for registering the Boer fighters and issuing rifles and ammunition. The undercurrent of unrest made the child feel anxious and he watched with eager curiosity as P.G. checked the cases of rifles and ammunition which arrived at "Constantia Villa," and then helped to stack them high in the rooms until the house became a veritable arsenal.

Before the raid P.G., like most sane-thinking South Africans, was becoming dissatisfied with the Kruger regime and felt that the problems which now had to be faced in the Transvaal were getting too big for the ageing President. He felt that, much as he liked and respected the old Voortrekker leader, a younger man, probably Schalk Burger or somebody like him, would have been better able to cope with the difficult situation. The Government of the Transvaal at the time was indeed no easy task. The opening of the goldfields had attracted men of all races and character - the "uitlanders" (foreigners) as they were called, and these uitlanders considerably outnumbered the true South African settlers of the Transvaal, who, it must not be forgotten, had made terrible sacrifices to open up the plains of the Transvaal hoping against hope to be able to live in peace at last - but that was not to be. Kruger thought that by denying the uitlanders all rights of citizenship and withholding their voting power he would eventually drive them away. He had under-

estimated the power of gold - the uitlanders had come to stay and more were to follow - the attraction of gold was too strong and the seekers after fortune many. This was a problem which had to be faced boldly and solved; it could not be dismissed. There were many South Africans who thought that had Kruger been replaced by a younger and less obstinate and dictatorial man, the Boer War might have been averted. However, the ill-timed Jameson Raid cancelled all hope of that. The treachery of the raid drew every Boer to Kruger's side, and he was thus assured of another term as President of the Transvaal Republic.

The years of the Boer War were to see a big change in the peaceful way of life of the van der Bijl family. The placid smooth-running stream of life which P.G. had worked so hard to build up for his family was rudely disturbed. The eldest son and P.G.'s youngest brother, so much younger than P.G. that he was almost a son to the family, went off to fight for their country, and with their going, sorrow, anxiety

and unhappiness entered the home of this tolerant, peace-loving family, for, although their son was to be spared to them, the young brother was never to return home.

P.G.'s bewilderment can well be imagined. All his life he had believed in tolerance and had taught his children to be peace-loving citizens respecting integrity of thought or effort wherever they found it. He had imbued them with a love for their country - this lovely land over which so much blood had already been spilled - and now horror, hate and bloodshed blazed all around them and their father was helpless and hopeless as all parents must be in times of war.

At last amid scenes of panic and confusion their home town, Pretoria, fell to the British. There had been days of looting with no administration or control. General Smuts had only just succeeded in getting the last train out of Pretoria, loaded with all the cash, assets, stores and ammunition he could lay his hands on. The capital, Pretoria, had fallen but the

Boers intended to fight on for as long as they could. This bold action of General Smuts in taking over by force the Government's gold reserves and every possible weapon, enabled the Boers to fight on for another two years, although the British and maybe even the Dutch themselves had thought that the fall of their capital would mean the end of the war.

The British naturally wished to re-establish order and a civilian way of life as speedily as possible and with a minimum of change, so General Roberts decided to approach the leading citizens of Pretoria with a view to obtaining their co-operation. What was left of the Government files was studied, and among the records that remained it was found that for many years a certain P. G. van der Bijl had handled all Government grain contracts and had earned an enviable reputation for integrity and efficiency. P.G. was thereupon asked to call on General Roberts.

It is not difficult to imagine that meeting. General Roberts tactful and conciliatory, trying

to make things as easy as possible, and the independent P.G., unhappy and reserved. Roberts' request was that P.G. should continue as he had done previously and handle once more all the Government grain contracts. P.G. looked straight at Roberts and replied: "I have a son and a young brother fighting out there against your forces and you ask me this? My answer is, of course, in the negative." Roberts stood up quickly and holding out his hand, promptly replied: "Meneer van der Bijl, in your place my reply would have been the same and I respect you for it."

It is possible that an echo of this conversation may have sped down the years to another time of war - sped nearly forty years to the beginning of our own World War II and that the spirit of old P.G. stood proudly by listening to a similar reply made by his son, his studious little Hendrik, who had now become one of the leading industrialists of South Africa, known and respected throughout the world. Hendrik Johannes was reading the government contract

appointing him Director-General of War Supplies:

“What is this?” he asked, pointing to a blank space in the document.

“Oh, that is the space left for you to fill in the salary you will require. I am instructed to tell you that you are at liberty to name your own figure.”

H.J. looked at his visitor much as old P.G. must have looked at General Roberts.

“Our boys are out there spilling their blood,” he said “and you ask me to put a price on the work I can do for them? Very well, here it is” and, pulling the contract towards him, he filled in the salary as £0.00 per annum.

That is the salary South Africa paid one of her ablest sons for more than six years of unremitting toil and effort.

However, that is another story, and we must return to Pretoria and the Boer War, or as the Boers called it, the “Engelse Oorlog” (the

English War). Having broken the ice, General Roberts talked for some time and, after warning P.G. that the fighting around Pretoria would be long and bitter, advised him to take his wife and the younger children to the Cape as soon as possible, offering him a protected train passage if he decided to act on the advice.

P.G. went home and after discussing the matter with his wife, decided to leave Pretoria. The decision to abandon their home and all the things it had stood for, comfort, security, happiness and success, must have been hard and heart-breaking, but the safety of the children was threatened so the family set out on yet another long, weary journey.

What an impression that journey made on the young and observant Hendrik! To him it was one of the most important events of his childhood. As a boy of nearly thirteen he was old enough to be aware of the sorrow and depression surrounding the departure of the family from their Pretoria home and to feel



HENDRIK JOHANNES GROENEWALD

H.J.'s maternal grandfather after whom he was named.

unhappy and unsafe as children do when the security of their home life is threatened. His elders might worry, but no normal boy of thirteen, in spite of the dimly comprehended sorrow around him, could help getting a thrill out of the situation.

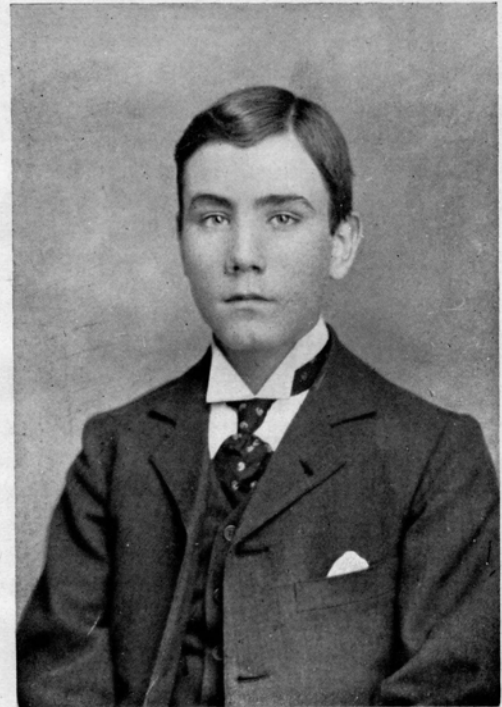
The family with the children, relations and servants, occupied a whole coach of the train and life became, for the younger children at least, one long picnic. So careful was General Roberts that his promise to P.G. should be honoured, that he gave orders that the train was not to move at night and the journey from Pretoria to Cape Town took fully eight days.

One of Hendrik's still vivid memories of the journey was of his mother and of her very typically feminine reaction to war. One evening as the train pulled up for the night, young Hendrik slipped off on his own and went on a tour of investigation. Not far down the line was another stationary train filled with Tommies. The Tommies, seeing the little South African boy, offered him a tin of bully

beef. Hendrik shyly refused saying they had lots of food, but the Tommies, believing that all Boer children were starving, pressed the gift on the child. Embarrassed, he ran back to his own coach, still clutching the tin of meat. As soon as he saw his mother he poured out his tale, only to see her burst into a flood of tears. More and more bewildered the boy asked: "But, Mother, what is the matter? I really tried not to take it but one of the Tommies threw the tin down to me and wouldn't take it back."

"Oh, oh!" sobbed his mother, "it's not the bully beef. Those poor Tommies have mothers far away in England and they are probably hungry and home-sick."

Such feminine reasoning was quite beyond the youngster and he went to bed that night still puzzling as to what possible connection there was between a tin of bully beef, mothers and home-sickness.



HENDRIK AS A BOY OF SIXTEEN.

Other memories of those days were neither amusing nor pleasant and were to burn themselves deeply into the soul of the growing and impressionable boy. To see and feel at such close quarters the misery and horror of war, magnified in its poignancy by the desperate helplessness and incomplete understanding of youth, was an experience he was never to forget. For years the scenes along the line were to haunt his dreams: burnt-out homes; groups of hopeless people living without shelter in hunger, misery and want. Wide-eyed he listened to the stories of the ever-increasing death roll of women and children in the concentration camps; to the tales of how both the British and the Dutch were burning down homesteads, ruining farms and laying waste this dear and lovely land; to be uplifted by some brave tale of daring and heroism only to be unhappy again at some cruel deception or betrayal and bewildered by the obvious lying propaganda of war, yet unable to sort the wheat from the chaff. He had been brought up in a home where tolerance and respect for

one's neighbours were bed-rock principles. There was just no explanation for all this misery. It was all so unreasonable and unnecessary. Young Hendrik had no burning desire to grow up to be a soldier - he wanted only in some way to defend his land from both sides and to be given the power to build it up again and straighten out the mess. All his life destruction, inefficiency and waste have annoyed him far more than plain stupidity.

When the family eventually arrived at the Cape they settled at Gordon's Bay, and life became less complicated for young Hendrik. Pieter Gerhard started once more to build a home for his family and to try to gather in the broken threads of their lives. With eight children, it was no easy task.

Schooling had been sadly neglected so the children were immediately sent off to a small school built by an aunt, a Mrs. Cloete, on her farm at Sir Lowry's Pass.



HENDRIK AS A STUDENT.

Right from the start Hendrik proved an exceptionally clever pupil, speedily making up for the time he had lost. Fortunately the language difficulty did not worry him as it did many of the other children. The home language of most of these children was Afrikaans (the “Taal” as it was then called), but school was carried out in High Dutch (the home tongue of the Hollanders), or in English. Hendrik speedily became trilingual. Later in Germany his studies had to be continued in German and this language, too, he speedily mastered, eventually giving fluent and highly technical lectures - and writing equally technical books and pamphlets in that language. Even today his speech shows traces of all the earlier influences and he speaks with a deep South African accent with an occasional flash of Americanese.

Fortunately the foolish policy of the teachers - Afrikaans as well as English - in trying to eradicate the Afrikaans language, left no racial hatred in young Hendrik’s make-up. The child-

ren were actually punished for using their home language and were made to wear placards around their necks announcing to the world that they had committed the vile sin of speaking “the taal.” Afrikaans was considered decidedly “common” - it was actually named “Low Dutch”, and few people realized that what was taking place in South Africa was merely a repetition of what had happened in England several hundred years earlier, when the English language was going through its birth agony and its fight for life with Latin.

Like English, the Taal was the new language of a new and vigorous nation, borrowing freely from all the languages around it - Dutch, English, French, Malay and even the native dialects, to become eventually a fine expressive language. Like English before it, the roots of this new, young language went very deep and no manmade law or petty punishing of children would eradicate it.

Some years later, in 1907, when he was studying at the Victoria College, Hendrik and a

few of his fellow students actually founded the “Afrikaanse Taal Vereniging” (the Afrikaans Language Society), which later grew in strength and eventually achieved its avowed purpose, which was to have the Afrikaans language and not Netherlands recognized as the second official language of the Union.

It is surprising that, surrounded as his boyhood was with so much racial ill-feeling and language difficulties, Hendrik should have grown up with a broad racial tolerance. Perhaps it was his love of learning and respect for all great work, whatever its origin, which developed this characteristic. Many a young man joining H.J.’s staff for the first time, and bent on making an impression by stressing the importance of his nationality or ancestry, must have been given food for thought by H.J.’s quiet advice: “Remember, my boy, that here we are not interested in nationality or ancestry - in our undertakings credit is given only to those who earn it by their own intelligence and effort.”

Later, in a speech to the South African Institution of Engineers in 1933, he was to sum up his feelings towards the language and racial problems of South Africa, in words which might well be framed in every schoolroom in South Africa. He said:

“My ideas of what makes a nation may differ from other people’s ideas, but they are the ideas I have formed from watching the material development of the world. I do not, for example, believe that any language on earth can, by itself, make a nation. Our two languages should, therefore, not be a stumbling block to our people becoming a united people that may some day call themselves a nation. Nor do I believe that any attempts at intensive cultural development can make a nation. Culture is, after all, born of achievement, not of political aspirations.

“What makes a nation today is the successful combination and concerted effort of the different elements in a community towards material achievement in a way that all

members of the community can individually and collectively be proud of, achievements to which all the different elements of the community have contributed, regardless of whether they are South Africans because they have adopted South Africa from choice, or whether they are South Africans because South Africa was thrust upon them by birth.”

The dedication of “Escom House” - the building which now houses most of the present-day Johannesburg staffs of the Van der Bijl Group of Companies and which became the brain centre of South Africa’s war effort during the years of crisis, stands as a permanent record of his fundamental ideal, an ideal he first put into words when concluding his inaugural speech as Chancellor of the University of Pretoria in December, 1934. It reads:

“Dedicated to the ideal of cementing together by common endeavour for achievement all the peoples of South Africa, regardless of race or creed, into a brotherhood of mutual trust and

goodwill for the welfare of our country and the glory of Almighty God.”

Work and honest endeavour - that was his ideal and therein he believed lay the solution of all our petty racial squabbles. If we could but think of South Africa first we would naturally be willing to welcome any man able to contribute to her welfare.

The boy Hendrik soon outgrew the little school at Sir Lowry's Pass and was then sent on to the Boys' High School at Franschhoek to take his matriculation. For the next four years life at Franschhoek flowed quietly and uneventfully on, although the seed of “big-business” was already beginning to sprout. When Hendrik was fifteen years old, it was decided that it was high time that the football and basket ball teams of the boys and girls at Franschhoek school needed more competition and they were anxious to challenge the children at school in Paarl. The difficulty was transport and this our budding business man decided to solve without delay.

At this time the first train service between Paarl and Franschhoek had been started and a very slow affair it was. The train puffed slowly along the line stopping every few minutes to pick up the fruit and produce of the surrounding farms, and taking a full four hours to complete the eighteen mile journey between the two little towns. The problem which faced the boys was how to get the teams to and from Paarl in one day and still leave time for the games. Hendrik decided to interview the station master. His tale was received with sympathy and after due consideration he was told that if an entire train were hired, the journey could be completed in one hour each way with no stops en route. This, however, would cost almost a fortune. Undaunted, however, Hendrik chartered the train - now to fill it and raise the money to pay for it. Feverishly he sped back to school, not quite so undaunted by now, and called in his pals. They had to solve the problem speedily. Notices were printed (by hand) offering a marvellous outing to Paarl, there and back all in one day

with time for shopping and sight-seeing, etc., etc. These were plastered throughout the village and when the great day arrived the train was packed - just about every member of the community had decided to take advantage of this unique opportunity and the venture was a huge success, both socially and financially.

As his schooling progressed Hendrik became more and more interested in a scholastic career but had not decided just what he wanted to study. Music, literature and philosophy interested him deeply, although the exactness and logic of science gave him the greatest satisfaction. His father had offered each of his four sons free education either to matriculation or B.A. standard, after which they were each to be given a farm to start them off in life. If, however, they decided to continue with their studies, P.G. offered to finance such studies, but the cost was to be debited against their share of the estate. Hendrik's decision to continue his studies in Germany cost over

£1,200, all of which he later repaid out of his earnings.

Essays written at this time show the trend of the developing mind. Rather pedantic and flowery in expression they show a depth of thought unusual in so young a student. In one of these essays, dated 1905, entitled "Students and Politics," he deplores the defective system of education and examination prevalent at the time. "More than one man," he writes. "leaves college with excellent certificates, but without an adequate amount of general knowledge. 'He knows Greek'; 'He reads Latin'; 'He has been to college'; ample apologies indeed for the ignorance of the graduate." He goes on:

"By paying too little attention to affairs of State and by making too feeble efforts to comprehend its problems, we have absolutely no conception of the real aim in life: the constant pursuit of a true ideal; the continual striving after the progress and welfare of one's country; the attempt to listen to and comply with the cry for happiness of the public."

“Racialism,” he says in this same essay, “should long ago have been swept out of existence - the fundamental aim of politics is unity, and hence a prosperous country and a flourishing nation. I fear that many of our people are as yet incapable of forming this lofty conception of the real nature of politics.”

Another essay, also dated 1905, and which evidently pleased the English Master, for he had written encouraging remarks in the margin, is entitled: “Ambition.” Hendrik first defines ambition and gives its Latin derivation and then goes on to say: “Ambition is a desire for fame, power, honour, excellence. This meaning may always be applicable to ambition, and yet ambition is of two kinds: it is vicious, and yet it can be virtuous; it is ignoble, and yet it is noble; it is unselfish, and yet it is vain-glorious.” To prove his point he quotes the vain-glorious ambition of Julius Caesar leading to his vain-glorious death, and compares it with the ambition of Peter the Great, who, according to our youthful essayist,

“did not seek fame or the esteem of his subjects, and yet was loved by them all. His chief aim was to become powerful - not to gratify his own selfish desire for power, but to promote the progress and welfare of his native country.” “This,” he says, “is the ambition which every man ought to have for ‘he that plots to be the only figure amongst cyphers, is the decay of an whole age’.”

The fact that he was to remain ever faithful to these high-sounding youthful ideals would probably have surprised the young student himself, but it can truthfully be said that his constant ideal of service has been the inspiration of and probably the reason for the almost incredible success of his many vast enterprises.

From school at Franschhoek, Hendrik went to Stellenbosch University, then the Victoria College, and in the tranquillity of the picturesque old town, with its grand old oaks, spent the next three years of his life, obtaining

in 1908, a B.A. degree with honours in chemistry, mathematics and physics.

Just before leaving Stellenbosch, Hendrik was told the gratifying news that he had won a first prize in physics and also the van der Horst prize of £10 for “the most deserving student of mathematics and physical science in the college.” What rejoicing there was! Here it was the end of term and money was getting scarce. What a windfall. Hendrik and his friends set off to celebrate. A grand time was had by all, and, calculating that there would still be a balance of prize money, Hendrik invested in several books he had long coveted. Absolutely penniless he discovered, to his horror, that the prize money would not be forthcoming until after he had left the College. As a result he arrived in Pretoria a very successful student, but financially bankrupt - so bankrupt that he had had to forego his meals on the journey and had to walk from Pretoria Station to his home in Sunnyside, where he eventually arrived well after midnight, exhausted and ravenous.

CHAPTER 3 A WORLD OF ART AND SCIENCE

*“I hold it the duty of one who is gifted,
and specially dowered in all men’s sight,
To know no rest till his life is lifted
Fully up to his gifts great height.”*

- Anon

IN 1909 Hendrik Johannes sailed for Germany in quest of further knowledge. He had decided to continue with his studies and to obtain a Doctor’s degree. The first semester he spent at Halle à/S, devoting most of his time there to the study of inorganic chemistry and the reading of philosophy. At Halle, philosophy was a compulsory subject for a Doctor’s degree and Hendrik found it intensely interesting. Like all young idealists he had had long discussions with his fellow students and had already read widely in an effort to solve the burning questions of the whys and wherefors of life. One of his sisters still remembers an incident which occurred when he was still a youngster. They were listening to Beethoven’s

music and, being profoundly moved, as all great music was always to move him, he turned to his sister and said: "To have the power to conceive such wonderful harmony a man must surely be in tune with the Almighty." The fact that some had this power and others not, worried his groping intelligence and he decided for himself that perhaps some minds were in closer harmony with the Power behind the Universe than others. Later, this idea expanded into the belief that the most satisfactory and acceptable explanation was that somehow life in all its varied forms, is the manifestation in varying degree of a Universal Intelligence. When he discovered later in his reading in Germany that this concept was the fundamental principle underlying the philosophy of Rudolph Eucken, he read extensively the works of this philosopher which propounded and expanded this same idea. Indeed he found the whole subject of philosophy thoroughly fascinating. It was all so beautifully logical once one had accepted the fundamental premise - but there lay the snag. That funda-

mental premise was, after all, only a guess, an idea conceived by a human brain and each philosopher started with a different concept. Science, however, was a different matter - here too the reasoning was clear, concise and beautifully logical, but the fundamental principles were empirically determined facts - very much more satisfactory to Hendrik's way of thinking. He decided, therefore, that science was his first choice and after spending one semester at Halle, entered the University of Leipzig to study for a Doctor's degree. He had chosen Leipzig because he was greatly impressed by the fine work of the men who were teaching at the university there - Professors Wiener, des Coudres, and Jaffe.

It was Professor Wiener who had made the important discovery of the direction of the electric and magnetic vectors in light rays.

On arrival at Leipzig, Professor Wiener suggested that, as a course of study for his Doctor's degree, Hendrik should undertake research into the behaviour of pure liquids

under the influence of radium rays, with the object of determining whether the same fundamental charge would be found to be carried by an electron in ionised liquids as had already been established for gases.

Professor J. J. Thompson, of Cambridge University, had already propounded the Electron Theory and had established the electron charge in ionised gases. After two years of study and research, H.J. finally established that the behaviour of an electron in purified liquids was identical to that of gases, which gave further confirmation of the Electron Theory.

During these two years the young student delved deeply into the realms of science. His enthusiasm and determination to solve the problems he had chosen knew no bounds. Long weeks were spent studying, calculating, experimenting and then rejecting, only to start yet again. He designed and had manufactured delicate apparatus and while he was calculating and observing time ceased to exist. The quanti-

ties of electricity he had set out to measure in order to determine the electronic charge were so minute that unless the weather conditions were perfect, accuracy was impossible. One day, after almost two years of struggle, the weather conditions were really ideal. For months the delicate apparatus he had designed had been thoroughly tuned up waiting for just this chance. With high hopes he locked himself in his laboratory, with the then strongest supply of radium in Europe, and measured and measured without break from ten o'clock in the morning until well past midnight. The thought of stopping for food or rest did not occur to him. At about two o'clock in the morning, he shut his laboratory door feeling supremely happy and confident that when he had completed the collation, co-ordination and calculation of the masses of figures he had measured during that long perfect day, the results would reveal the answer to his long search.



HENDRIK AS INSTRUCTOR OF PHYSICS IN DRESDEN (1912).

“I will just sleep for a few hours,” he said to himself, “then I’ll be back to start my calculations.” However, the physical Hendrik who had ceased to exist that day, now asserted himself and the boy with his head in the clouds, found that he had to stop dreaming of electrons and measurements and success and had to concentrate on getting his legs to function long enough to get him to his rooms. He succeeded only by exerting every effort of will and fell into bed completely exhausted.

It was late the following morning before he was able to start again. He had, however, misjudged neither the weather nor his measurements, and the truth of the theory he had set out to prove was confirmed beyond doubt.

During these student days Hendrik lived very simply, glorying in the vast storehouse of knowledge that had been opened to him. For recreation he read poetry, listened to music, played tennis or went off swimming or on sight-seeing tours with his fellow students.

Music was an old love. At one time he almost decided to make it his career. All through his school and student days in South Africa, he had kept up his piano playing and while still at High School actually composed a melody which he called the "Constantia Waltz." The original manuscript, most professionally scored, but written in his still boyish script, is among his old papers. It is a quaint, lilting melody typical of the old-fashioned waltz of those days.

In Germany he always had a piano in his rooms and before attending an opera or an orchestral concert, would spend some time at his piano going through the music he was about to hear. In this way he found that not only did his knowledge of music increase, but his pleasure and appreciation of the actual performance was greatly enhanced. In Germany, of course, he had plenty of opportunity for hearing good music. In Leipzig itself the conductor, Arthur Nikisch, gave a weekly orchestral concert at the Gewandhaus. These concerts took place every Thursday night and the final, full dress

rehearsal was always held on a Wednesday morning, students being admitted to these rehearsals for a very small charge. During his years in Leipzig, Hendrik seldom missed these Wednesday morning treats.

Holidays and week-ends were filled with sight-seeing tours. Long hours were spent tramping through the Art Galleries in Germany and Italy studying, appreciating or rejecting. He even managed a trip to The Hague to soak in the beauty of the Dutch paintings there.

Architecture, too, fascinated him and in his old diaries he has recorded his impressions of the lovely old buildings which appealed to him and there are numerous sketches of what he considered sensibly designed homes. Towards the end of H.J.'s student days at Leipzig, an incident occurred which is still vivid in his memory. He often has a quiet laugh at the thought of the agony of mind he suffered over an imagined disaster which, instead, turned out to be one of the high-lights of his career. Professor Wiener was considered as something

of a martinet and stood no nonsense from his students. Every Friday evening he held colloquia - friendly discussions on current scientific problems – which he insisted that all his senior students should attend. Local belief among the students had it that anybody not attending colloquium would be taken severely to task and would incur the dreaded wrath of the Professor. One particular Friday evening, for no rhyme or reason, Hendrik decided to play truant and bother the consequences. Next morning a now very worried student was summoned to Professor Wiener's office. There were only three weeks to go before the final examinations and, being at heart a most conscientious student, Hendrik wondered why he had ever been so foolish. His fears, however, proved groundless for, instead of the expected rebuke, Professor Wiener merely wanted to tell him some very good news. The Professor had been asked by the Saxon Ministry of Education to recommend an Assistant in Physics for the Royal School of Technology at Dresden and had, after careful

consideration, decided to select H.J. for the position. That a South African boy and a foreigner should have been chosen for this position was a gratifying honour - an honour which H.J. readily appreciated, but the appointment offered was for a minimum period of two years, which seemed a long time to the young and impatient student, bent on cramming just as much as he possibly could into every minute of his days. Eventually a concession was granted and H.J. was allowed to accept the position for only one year, or longer if he so desired.

The beginning of 1912 saw the 24-year-old South African taking up his duties as a very serious Instructor in Physics at Dresden. He had left Leipzig with the degrees of Master of Arts and Doctor of Philosophy in Physics, Mathematics and Chemistry.

At this time Hendrik was in appearance very much the young predikant of his mother's joking prediction - serious, wearing high stiff collars, with a pale face, neatly brushed dark

hair and spectacles. Always neat and immaculate in his dressing, he appeared older than his years. He could be gay and frivolous and enjoy the crazy things of youth, but his interest was in his work and no effort was too great to master the problems before him.

Fortunately his duties as a Lecturer at the Royal School of Technology at Dresden left considerable time for continued research work. The head of the Department of Physics at Dresden at that time was Professor Hallwachs, the discoverer of the photo-electric effect. The young lecturer soon realized the value of Hallwachs' work and the sincerity and charm of the man himself soon won his deep admiration and respect. What Hallwachs had observed was that when ultra-violet light was made to impinge on the surface of a metallic plate, some of the electrons in the atoms of the metal became dislodged and were hurled into space at high speed. Regarding this discovery as the opening of yet another door into the realms of the unknown, H.J. was inspired by Hallwachs with the desire to make

further studies of this photo-electric effect. He decided to make a serious attempt at measuring the velocity with which electrons are emitted from metals under the influence of ultra-violet light.

It was during this research work on photo-electricity that H.J. made the epoch-making discovery of the extent to which an electric field "strayed" through a metallic grid.

At that time, other scientists were also endeavouring to determine the emission velocity of electrons. The Electron Theory laid down what this velocity should be but, up to that time, it had not been possible to get agreement between theory and experimentally determined velocity. This failure to get agreement made the subject intensely interesting. If the theory could not be confirmed in practice, it meant the death knell of the Electron Theory and with it the Quantum Theory and the whole basis of the "new physics" would be in jeopardy.

In order to understand and appreciate the value of his work at this time, it is necessary to explain very briefly an outline of the problems he had set out to solve.

To ensure that the electrons emitted from the surface of the metallic plate (the cathode) are caught on another plate (the anode) in sufficient numbers to be measured, it had become the general practice to interpose a metallic gauze or grid between the two plates and to impress a sufficiently high voltage on the anode plate and grid to hurl the electrons through the meshes of the grid on to the anode plate.

After spending weeks in the library studying the works of others on the problem, H.J. began to sense the possible cause of the trouble. Several more weeks were spent in designing a special piece of equipment which he hoped would enable him to track down the root cause of the bewildering discrepancies. The months that followed were a repetition of his student days at Leipzig and he worked long hours at his self imposed task. It is true that real enthusiasm for

the solution of an interesting problem lends zest and meaning to life, for in those early days H.J. was deeply happy, yet he was thousands of miles from home, living in rather comfortless rooms, and his staple diet was bacon and eggs eaten at any odd moment he could spare. What did all that matter? His mind was on a different plane, perhaps with the gods, delving into the great unknown.

Eventually this task too began to work itself out and H.J. was able to prove by experiment that the discrepancies which had been observed by other scientists were not due to the incorrectness of the Electron Theory, as had been suspected, but were caused by the electric field “straying” through the metallic grid or gauze and, with the equipment he had designed, he was able to determine empirically the exact extent to which this stray field made the apparent velocities of the electrons differ from the true velocities predicted by the Electron Theory. These calculations he transcribed into a mathematical equation and embodied his

findings in a paper which he published in the “Verhandlungen der Deutschen Physikalischen Gesellschaft” (p. 330, 1913).

Just before publishing his paper young van der Bijl met Professor Millikan, Professor of Physics at the University of Chicago.

Professor Millikan was, at that time, a man in his early forties and well known for his excellent scientific research work. He had come to Germany to read his paper on the high emission velocities he had observed which was in direct conflict with the Electron Theory and for which there appeared no adequate explanation. After reading his paper - which created something of a stir in the scientific world, he visited Dresden and the young South African physicist was deputed to show him over the laboratories. While going over the college, they discussed their respective researches and discovered that van der Bijl's determination of the stray field not only confirmed the deductions from the Electron Theory but

correctly explained the apparent high velocities which Professor Millikan had observed.

Professor Millikan was in every sense a true scientist for, although H.J.'s discoveries and calculations completely discredited the paper the older scientist had just written, he was ready to welcome a correct explanation of a hitherto baffling phenomenon and the confirmation of an accepted theory. His congratulations were warm and sincere. Returning to America, Professor Millikan went further and persuaded the American Telephone and Telegraph Company and the Western Electric Company, with whom he was associated, to obtain without delay the services of this clever young physicist for whom he predicted a brilliant future.

H.J., gladly accepted the offer and blithely set out for New York.

This chance meeting with Professor Millikan in Dresden was to be a major turning point in his life.

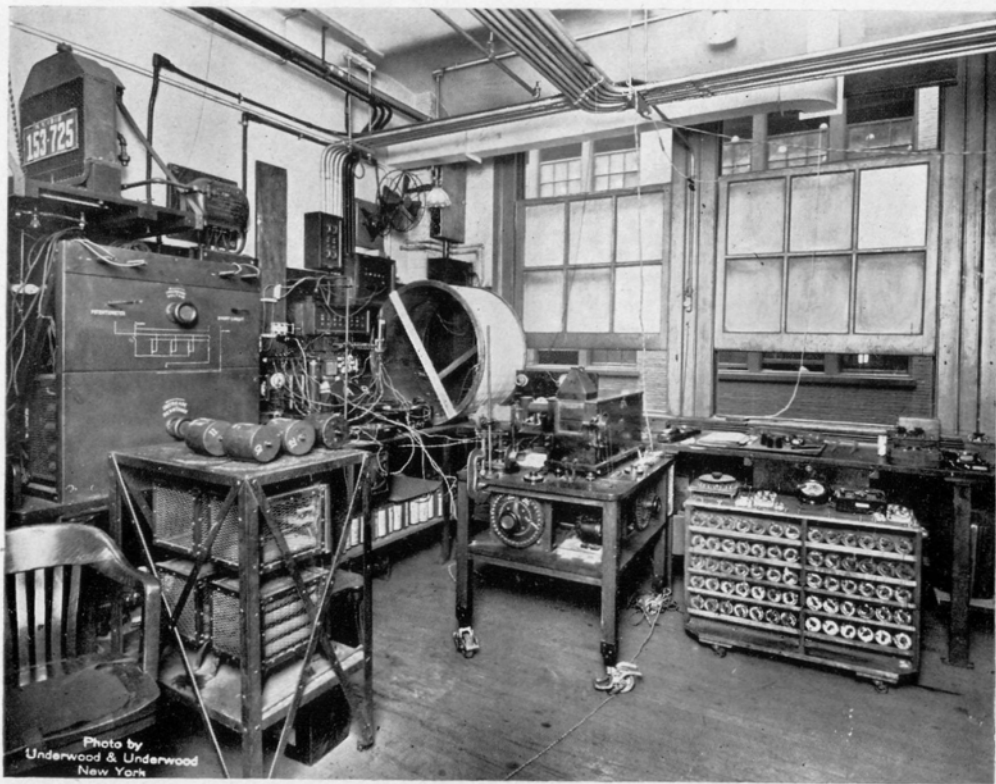


Photo by
Underwood & Underwood
New York

A CORNER OF H.J.'S LABORATORY IN NEW YORK (1914).

Quite apart from the fame he earned as a scientist during the seven years he spent in America, his contact with American ideas and methods had a profound influence on his whole outlook. He was greatly impressed by the vigour, efficiency and speed with which the Americans tackled their problems, by their intensive use of electric power and their large scale planning for the future. Only a short time previously America had been a comparatively undeveloped country, very like South Africa, but at the rate the Americans were progressing no corner would remain undeveloped for long. The spirit of optimism in America was so very like his own firm belief that every step in life must be a step forward, even if many a backward slip were encountered on the way.

Once having settled in New York, H.J. speedily got down to work. The American Telephone and Telegraph Company had recently bought the patent rights of the Lee de Forest Audion, now commonly known as the Thermionic Vacuum Tube or Valve. Little, however, was

known of its properties or the possibilities of its application. The solving of these riddles was assigned to the young South African research scientist.

All his life H.J. has affirmed his belief that achievement can only be won by hard work and effort and he has been prepared to work and work hard to fulfil his plans. Yet there has always been an element of good fortune in all his undertakings as if a kindly Providence were watching over him ready to give him an occasional lucky break.

The story of the Thermionic Vacuum Tube is certainly a story of luck as well as a remarkable coincidence, for from that chance meeting with Professor Millikan in Dresden was to come the solution of a baffling scientific problem. During the four years he had spent in Dresden and Leipzig, he had given a good deal of thought to the problem of wireless telephony and, at that time, it was a baffling problem. Wireless telegraphy had already been developed into a practical commercial proposition through the

efforts of Marconi, Braun, Popoff and others. Wireless telephony, on the other hand, was an entirely different matter. Wireless telegraphy was possible with almost any form of irregular wave, such as those obtained from sparks, but wireless telephony needed the generation of continuous waves of even intensity and, up to that time, such waves had not been produced in a satisfactory practical manner. Furthermore, if continuous waves could be produced, they still had to be modulated in accordance with ordinary audible speech waves. Wireless telephony at the time was still only a dream although the much simpler wireless telegraphy was already a commercial achievement.

In his work at Dresden he had been experimenting with a tube which contained a source of electrons (in this case a zinc plate illuminated with ultra-violet light), an anode plate on which the liberated electrons impinged and an interposed grid. When, at the very commencement of his work in America he was handed the de Forest "audion" or valve as it

was later called, he immediately realized that here was merely a modified form of the equipment he himself had designed in Dresden. In other words, with totally different aims in view van der Bijl and Lee de Forest had been experimenting with almost identical apparatus. The de Forest audion contained an anode plate, an interposed grid and a source of electrons which, in this case, was a heated filament, much like the filament of an ordinary electric light bulb. When a filament is heated, the electrons boil out of it much as they do out of a plate illuminated by ultra-violet light. The South African's purpose had been to measure the velocity with which these electrons start on their journey, the American, de Forest, on the other hand, had designed his equipment in an attempt to detect electro-magnetic waves.

It had also been discovered by Armstrong that the de Forest tube could generate continuous electro-magnetic waves, although H.J. remembers reading a report in 1913 by an engineer who maintained that he could not believe

Armstrong's invention because "it meant the violation of the Laws of Thermodynamics!"

Here then was a most remarkable instrument - a glass tube containing a filament, a grid and a plate - which was capable of performing seeming miracles, but nobody knew how or why.

When the Lee de Forest tube was handed to H.J. in New York, he realized that the Fates had indeed been kind to him, because this tube designed by Lee de Forest was so like the tube he himself had designed in Dresden, the stray-field relation which he had discovered, therefore, applied equally to the de Forest tube and from the calculations he had already made, it was a comparatively simple matter to establish, in record time, the fundamental equation governing the operation of the three-electrode tube or valve. This equation became known as the van der Bijl equation and from this he was able to propound the mathematical theory governing the operation of the valve, which is still the basis of its application to all

wireless telephone and telegraph work. Later he embodied his researches in a treatise entitled "The Thermionic Vacuum Tube" which was published in 1920 and which for over twenty years was the standard textbook on the subject.

Only a few years ago, Mr. F. B. Jewett, President of the National Academy of Sciences, and an old friend of these "radio" days, sent on to H.J. a letter from Mr. Herbert Gasser, Director of the Rockefeller Institute and a Nobel prize-winner for 1944, in which he writes.

"Perhaps you may not know about the very cordial co-operation we got from the engineers of the Western Electric Company in the days when we were getting started. In the beginning we knew only what we wanted to do and it is hard to over-estimate the value of the advice that was given so patiently to us in our uninstructed state. When van der Bijl's book appeared in 1920 it became our forte. For more than ten years the telephone repeater tube was

used in the amplifier design; and the Johnson oscillograph held its place until the development of high vacuum tubes leading towards television.”

H.J. still has the original valve he designed and made in 1914 - a most interesting piece of apparatus - for the first application of this tube made possible telephone conversation over long distances and, towards the end of 1914, a telephone conversation was actually held between New York and San Francisco - a distance of over 3,000 miles. This same design of valve was used extensively on all telephone circuits for the next 20 years and was replaced in 1934 by a valve of similar design but one which used less electric current.

Further research into the wireless detecting properties of the valve opened up the possibility of its being used as a modulator of wireless waves and its application to wireless telephony. It was in May, 1914, while working on his theory of the operation of the valve, he discovered that because of its non-linear

current-voltage characteristic, the valve could be used for modulating high frequency continuous wireless waves with speech waves, and in his research notes bearing this date he shows several circuits whereby this could be done.

Eventually all the requirements for wireless telephony were met and, only a year after the successful application of the thermionic valve for long distance metallic telephone circuits, it was possible to talk by wireless from New York to Honolulu - a distance of 5,000 miles. Shortly after this human conversation was transmitted from New York to Paris.

This first transmission of speech without the aid of wires took place under dramatic circumstances. The date was the 21st October, 1915, and World War I was still raging, so the experiments were carried out in secret. American scientists in Paris, with their receiving equipment on the Eiffel Tower, for the first time in the history of the world, heard

the voices of their fellow scientists in America, speaking to them through the ether.

Twenty-five years later - 21st October, 1940 - fifteen of the original nineteen scientists responsible for this stupendous achievement, gathered together in New York to celebrate the anniversary. Unfortunately, although in the world of science man had progressed by unbelievable strides, the age-old savage methods of settling disputes was still in force, and World War II was raging. Dr. van der Bijl, more than fully occupied in South Africa as Director-General of Supplies, could naturally not join his old comrades, but they all sent letters and cables telling him of the gathering and regretting his enforced absence.

These nineteen scientists are the original and only members of the "Society of Planners and Builders" and Dr. van der Bijl greatly prizes his certificate of membership, which he has had framed and which hangs proudly in a place of honour in his study at home. When the last member of this group dies, the Society will die

with him, but the great achievements of these "Planners and Builders" can never pass away, for they have given to the world intelligence communication - communication by telephone, by wireless and by radio broadcasting. They have given us the power, could we but use this miracle of science for its rightful purpose, to bring together in bonds of understanding all the members of the great human family.

During the early part of World War I, H.J. designed a simplified type of valve which could be used for ordinary wireless work on the battlefield and which could be manufactured very cheaply. This became known as the "French valve" because the French authorities made several millions of this type of valve for use by the Allied forces.

H.J. spent seven years with the Bell Telephone Companies, from 1913 to 1920, and during this time made many interesting discoveries and inventions which were to have far reaching effects on the development of wireless transmission and television.

One of his inventions - a cathode ray oscillograph - was later developed by Dr. Johnson, formerly one of his assistants, into a very useful and popular commercial instrument. Another was a system of multiplex wireless telegraphy and telephony by which a considerable number of telegraph and telephone messages could be transmitted simultaneously from the same aerial.

A more important invention was a system of secret transmission of intelligence. Early in 1917 he worked out the mathematical theory of this invention, which in effect consists of turning speech upside down, so that any unauthorized person listening in would hear only a jumble of unintelligible sound, but at the receiving end the speech was turned right side up again. H.J. promptly rigged up a trial circuit in his laboratory to test out the mathematical theory and found that the theory was also a practical possibility. At the time this experimental circuit caused much amusement to the unsuspecting victims asked to listen in and give

their comments. This invention was not put into wide commercial use until about eighteen years later, but it is the basis of what is now known as the "scramble telephone."

His research into the possibility of transmitting pictures by telegraph also led to interesting and useful information becoming available. Up to that time pictures had been transmitted by telegraph on a few occasions, but the process was a slow one and the shading not true. In these attempts a selenium cell was used because when a selenium cell is illuminated with light, its electrical resistance changes.

After an exhaustive study of this phenomenon H.J. found that the change in electrical resistance of the selenium was not strictly proportional to the intensity of the light that caused it, and also that selenium did not react instantaneously under the influence of light - these were two fundamental requirements for the successful transmission of pictures, so he decided to rule selenium right out. From his earlier work in Dresden he knew that the photo-

electric cell did meet these requirements, but the amount of electrical current was too small to be practical. On the other hand, the thermionic vacuum tube had now been so developed (this was in August, 1915) that it could amplify the minutest currents to any desired strength. Piecing together his knowledge of the behaviour of the photo-electric cell, on the one hand, and his knowledge of the thermionic valve on the other, he was able to suggest a combination of the two effects which was the beginning of practical successful tele-photography. This and the cathode ray oscillograph mentioned above were vital steps in the development of television which followed later.

All this was accomplished before he was thirty years of age, which probably accounts for his persistent faith in youth. All through his career he has always been willing to trust the carrying out of his plans to the young men of his companies. He will conceive an idea then weave from it a vision of the development he can foresee. He will then choose a group of

promising young men and explain his plans. From there they must carry on, taking as much responsibility as they can carry, growing with the job in hand, but fortified by the knowledge that always in the background is the source of their inspiration ready and willing to make the difficult decisions and take the final responsibility. H.J. maintains that this is one of the secrets of the almost unbelievable success of his undertakings - his ability to choose his men and his willingness to let them try their wings, granting them always authority commensurate with their responsibility. If mistakes are made, as naturally they are, well, these too have their reason and are valuable experience, but they must not be repeated. To use his own favourite expression: "Only a donkey bumps its head against the same wall twice."

But to return to New York. During his years with the Bell Telephone and Telegraph Companies, Dr. van der Bijl also spent a good deal of his time on patent litigation work as an

expert witness for his companies, piling up valuable experience of Law.

His work in this field - patent litigation - was held in high esteem and even after he returned to South Africa his advice and opinions were sought on many involved problems in this field. One American company, according to an old letter in his files, offered him a large fee in an effort to induce him to return to the United States to give expert witness on their behalf on a patent controversy involving highly technical matters. They suggested £100 per day from the time he left South Africa until his return at the conclusion of the case, plus all expenses involved. Dr. van der Bijl had, however, just embarked upon his battle for the establishment of an iron and steel industry in South Africa and personal gain had to be sacrificed.

Towards the end of his stay in America he was invited by the University of Chicago to give a series of lectures on thermionics. During the summer vacations the University invited leading world experts on various topics to visit

the University and deliver lectures on the developments taking place in their particular field of endeavour. These lectures served as refresher courses for professors and lecturers as well as for research workers and visitors who came from all parts of the world. At the time Dr. van der Bijl was considered the leading world expert on Thermionics and was called upon to give lectures on this subject to a learned gathering of men, many of whom were twice his age.

In 1919 he published a paper on "Scientific Research and Industrial Development" which shows how his thoughts were turning towards industry. In this paper he pleads for the intelligent co-ordination of science and industry and notes "with pleasure and satisfaction" that steps were being taken in South Africa to apply scientific methods to industrial development. There are, he says in this paper, three fundamental processes which contribute to the growth of industry: "pure scientific research," which he defines as research undertaken solely

for the purpose of getting after facts, thereby stretching the bounds of human knowledge. This kind of research, he maintains, continues without end because “the more our sphere of knowledge is enlarged, the greater becomes its contact with the unknown.” The second fundamental process he calls “industrial research - which differs from pure scientific research only in that the motive here is purely utilitarian and the industrial researcher directs his investigations towards those results only which will repay him in pounds, shillings and pence.” The third process he calls “engineering development work, which constitutes the direct utilisation of available facts in the development of an industry.”

It is in this same paper that he propounds an idea which he was to use so successfully in all the industries which were to be his life work to launch. He says “the mere conception of an idea is only a germ cell, and it requires an army of experts to give it careful nursing, persevering thought and the almost unlimited painstaking

effort to bring it to a state of maturity.” In all his later work he would spare no effort or expense to get the best advice possible or to obtain expert assistance. Every problem had to pass under the powerful lens of his inquiring mind. He would read and study until a solution presented itself - until he himself became expert in the special field which, at any particular moment, held his interest. Whatever he did must be done well, the foundations must be firm, the structure sound and the “unlimited painstaking effort” would have its own reward.

In 1915 he married an American girl, Florence Wagner, whom he had first met when she was studying music in Germany.

Pictures of H.J. during these years in New York show him as still the serious young scientist, very immaculate and erect, but with his black hair now rapidly turning white. His recreations were still mainly music, reading and tennis. Poetry, too, gave him great pleasure, and he would make copious notes of the passages which pleased him. Like most

youthful idealists he was impressed by the noble passages extolling perfection of effort and his old notebooks abound with high-minded quotations. The capacity for foolery was, however, not far below the surface and every so now and again, amid some noble passage from Shakespeare, there appear comic little verses of his own.

In one of these old notebooks under the heading "New York – 1914" he gives his comments on Milton's "Paradise Lost." The passage: "From morn till noon he fell, from noon to dewy eve, a summer's day," was evidently too much for his scientific mind, for underneath he has written

IF Satan really fell that long, just think
The speed he's sure to have attained
If that which made him fall was this same
force

That hurls a man to earth whene'er he
slips,

And lo, the distance he was Flung through
space.

Assume we in a vacuum Satan fell
For air resistance at a speed so high
Which varies too, is sure to drag entire
The formulations of a sorry man's
Poor calculations right into the mire.
So let us say he fell through space devoid
Of air - nor trouble about his breath at all.
And let that "Summer's day," for mercy's
sake,

Be counted only six to six at eve,
With these assumptions let us state the
length

Of our Satan's mighty fall;
He fell no less than five point sixty million
miles in all.

Epilogue (with apologies to Shakespeare)
"Oh, what a Fall was there, my
Countrymen."

CHAPTER 4

THE CALL OF SOUTH AFRICA

“This is my own, my native land.”

IN South Africa old Pieter Gerhard van der Bijl and his wife were following with loving pride, the progress of their brilliant son, but the longing to see him again was growing with the years. Father van der Bijl was beginning to feel the weight of his years. He had had several heart attacks and felt that his time was near. In August, 1919, his old friend and comrade, Louis Botha, had been to see him - the one old South African bed-ridden, the other seemingly in good spirits and health - but Louis Botha had gone home and, after a short illness, quietly died - leaving P.G. to mourn the death of yet another old friend:

Early in 1918, General Smuts, another close friend of the van der Bijl family, had approached P.G. with the idea of persuading Hendrik to return to South Africa to accept the position of Scientific and Technical Adviser to

the South African Government. Far away in New York, Hendrik himself found it difficult to decide. In those days the distance between South Africa and America was still formidable and, although he was anxious to see his parents again, the end of the 1914-1918 war was not yet in sight, and in addition to his normal routine work, H.J. was also engaged on secret scientific development research for the United States Government. The comments of his fellow workers did not help matters. They thought him a fool and said so. His scientific work was already so valuable - he had contributed so much and here he proposed leaving it all to go back to a place called South Africa. They could not believe he would really go. On the other hand, General Smuts, ambitious for South Africa's future, was determined to persuade his gifted young friend to return home and to use his talents for the development of his own country.

Once H.J. had made his decision, his friends gathered around to wish him luck. They gave

farewell parties and wrote songs and verses in his honour. The most popular was a song composed by a young engineer named Watkins, based on a well-known tune from the Gondoliers, and H.J. still treasures the original manuscript, which was signed and presented to him by all those old friends. Reading through the long list of signatures he remembers each young face and he hears again those lusty voices singing:

I am going to sing a song to you,
That is if you will let me,
About a well-known engineer,
In honour of whom we're gathered here,
That ought to make his identity clear
In other words, you get me,
To sing his praise, you'll all agree,
Is worth our best endeavour.
Of that there is no manner of doubt,
No probable, possible shadow of doubt,
No possible doubt whatever.

His fame is great, his brow is high,

Through working out equations;
He'll bounce electrons on a plate
Till they're in a highly exhausted state
And then consign them to their fate
With horrible integrations.
His equal you will seldom find,
In anything whatever;
Of that there is no manner of doubt, etc.

And now, I'm sorry to say, I come
To the sad part of my story,
For this thermionical engineer
Is going to leave us soon I fear,
And sail the ocean far from here
To other fields of glory;
But he will still be joined to us
By ties that naught can sever;
Of that there is no manner of doubt, etc.

Before we speed him on his way,
I think we should remind him:
We hope he'll tear himself away
From Africa's sunny shore one day,
And visit in the U.S.A.

The friends he leaves behind him.
So van der Bijl may fortune smile
On you and your seed forever;
But of that there is no manner of doubt, etc.

Another favourite was composed to the tune of “Bonny Prince Charlie,” and as these young engineers shouted the chorus they firmly believed that he would “come back again,” for they still could not credit that he would willingly abandon an already spectacular career to start again from scratch in a totally different field of endeavour.

It is possible that H.J. himself hardly realized the finality of the change he was making. He had literally closed a chapter of his life and was starting out on the second stage of a career which was to have three distinct parts
Scientist, Engineer, Industrialist.

An amusing incident occurred a couple of years ago in London at one of the Scientific and Engineering Societies’ meetings. H.J. was chatting to a group of young men and one of

them mentioned that he was busy studying the “Thermionic Vacuum Tube” and in a11 innocence asked: “Dr. van der Bijl, are you by any chance related to the author - he was certainly a brilliant scientist, and it seems such a shame that he died so young - in 1922, I believe.” Amid the laughter that followed, H.J. found it difficult to convince the young man that he was indeed the same person.

In South Africa his decision to return was welcomed with delight. His parents could not wait for the time to pass when they would have their Hendrik home again. But the Fates were unkind, for old Pieter Gerhard died of a heart attack just a few months before Hendrik and his wife arrived in Pretoria.

With his usual energy and enthusiasm, H.J. started work as Scientific and Technical Adviser to the Government, but South Africa was still busy bitterly fighting her racial and political war - politics were more important than progress - and the waste of time and energy made H.J. sick at heart. They were so

useless, these racial squabbles kept alive by the politicians for their own ends, while a vast and beautiful land filled with promise was being left to muddle along. Several times he decided to give up and go back to his satisfying research work where the goal was achievement and the nationality of a man's colleagues did not count. However, it was against his whole nature to give up without a fight and he resolved to stay a little longer to see if he could not awaken his fellow countrymen to the fact that they must work together to develop the land about them, or perish. Their mainstay, gold, was a wasting asset, they could not go on relying on this source of wealth forever.

He had seen what the extensive use of electric power had done in America and knew the value of iron and steel. In September, 1921, in an interview with a *Rand Daily Mail* reporter, he said: "I feel that South Africa should be a regular workshop with her vast deposits of iron and coal and all the other raw materials necessary for the building up of

industries." "Coal and iron," he says, "are the foundation not only of an iron and steel industry - vastly important in itself - but the key industry upon which scores of other industries can be built." He studied closely and with growing alarm the whole economic set-up of the Union, and wrote numerous articles stressing his belief that the extent to which the prosperity of the country depended on gold and diamond mining was a cause for the gravest concern. In a paper on Railway Electrification and Industrial Development in South Africa, dated May, 1922, he says:

"The dependence of the country on a wasting asset is what struck me most forcibly on my return to South Africa after many years' absence. It is time that every South African should take this condition of affairs to heart and assist in doing whatever can be done to get away from it as soon as possible." Further on in this same paper he makes an appeal which could be applied in the self-same words to conditions in South Africa today, in spite of

our phenomenal industrial growth over the last 25 years. He says: "It is well to remember that a large number of industries have sprung up under very abnormal conditions, at a time when overseas competition was not and could not be a serious factor, for the reason that the competing countries were hampered by war emergencies. Even now they are hampered by industrial depression. When the cloud of depression clears away from America and England, our industrial skies are likely to darken, at least as far as manufacturing industries are concerned. No industrial country can live by itself alone. Improved means of communication and transport have made each country a part of all ... hence industries that want to gain a permanent foothold must aim at a standard which is determined by the foremost countries in the world. Unless we are properly guided and the greatest care is exercised we may establish a standard of industry which is low enough to overshadow the great advantages which this country has to offer."

During 1922, as Technical Adviser to the South African Government, H.J. was given a surprising range of tasks. One of the first of these was to draft a Weights and Measures Bill. He still laughs over some of his experiences while investigating standard weights for this Bill. With no control or standardization whatever, it was a trick at this time for some traders to keep two sets of weights - one set over weighted for buying and the other under weighted for selling! Petrol was sold to retailers by the imperial gallon, but there were hundreds of American gallon petrol cans in the country, so the traders promptly used these cans for measuring out their sales, making an immediate profit of about fifteen per cent. Those were the days when a motor-car driver looked down on the world from a great height and never dreamed of setting off on any trip without a spare gallon can of petrol under the seat.

When drafting the Weights and Measures Bill, Dr. van der Bijl decided to base the inch on the

international metric standard of Brussels. He felt that South Africa would eventually adopt the metric system in which case the basic inch would be in accordance with the metric standard and would facilitate the change-over. The difference between the metric and British standard inch was almost infinitesimal, but when the Bill was submitted to Parliament, the late John X. Merriman, much to H.J.'s surprise, immediately noticed the difference and sent H.J. a note asking him to discuss the matter. When it was explained to John X. and the then Government Surveyor that the metric inch would make, in triangulation work, a difference of only a small fraction of an inch in a mile, it was decided to leave the calculations as they were.

Another amusing incident occurred when H.J. was asked to make an investigation into the purity of South African produced jam. Evidently certain overseas exporters were alarmed at the growing South African jam production and started a rumour that South

African jams were impure and some were even contaminated by the use of a substance called "glucose," which some people considered to be poisonous! One South African jam producer immediately offered £200 to anyone who could prove that South African jam did contain this dreadful stuff. Immediately another, now famous, jam maker appeared in H.J.'s office to say that he always added glucose to his jams which were made according to his mother's recipe and that the glucose kept the fruit whole and luscious. H.J. then set to work to examine this sinister "glucose" and, of course, found its true value. Needless to say the £200 was never paid.

During 1922 his more important work which was, of course, more to his liking, was his investigations and reports on railway electrification, the possibility of establishing a wireless receiving and transmission station in South Africa, measures for the encouragement of the development of the iron and steel industry and ways and means of providing a cheap and

abundant supply of electricity for the country, in spite of the formidable distances between industrialized points and towns and the lack of capital.

In order to make his report on the most satisfactory method of establishing a wireless receiving and transmission station, he first went to Windhoek to examine the station built there during the 1914-1918 War by the Germans, and to see if this station could not be used. However, with his knowledge of the latest developments in the wireless world and the speed with which such developments were progressing, he realized that the Windhoek station was already obsolete and would be a liability instead of an asset. The proposal of the British Government to link South Africa with Britain by a series of relay stations, did not appeal to him either, because he knew that in a very short time, at the rate things were going - his own inventions had helped to push them on even faster - it would be possible to send and receive messages over very long

distances and that such a series of relay stations would be out of date even before they could be properly established. His recommendation, which the Union Government accepted, was to invite the Marconi Telegraph Company to erect and operate a wireless receiving and transmitting station at a suitable place in the Union which would put South Africa into direct touch with Europe, America and other parts of the world. This was eventually carried out and the Marconi Company built the first wireless transmitting station at Klipheuvel and a receiving station at Milnerton in the Cape.

Now that the foundations of a modern communication system were laid, he turned his attention to electricity and steel. He knew that if he could but give South Africa iron and steel and cheap electricity, other industries would automatically grow from these foundations. It was an uphill fight and a disheartening one. He had no patience with the typical South African outlook of “môre’s nog ’n dag” (tomorrow is another day). He hated the procrastination and

delay and eventually, in desperation, decided to accept a tempting American offer he had received and to leave South Africa.

Fortunately, however, under the leadership of General Smuts, the Government finally decided to use one of his ideas and to form a Commission to control the development of electricity throughout South Africa, and he was offered the position as Chairman and given the task of launching the new venture.

Working in close collaboration with Sir Robert Kotze, who was in large measure responsible for shepherding the Electricity Act through Parliament and who later became Chairman of the Electricity Control Board, H.J. at last saw the beginning, at least, of the realization of another of his dreams.

For a man not yet 35 years old it was a colossal job, for the task of starting this new venture was not an easy one and the difficulties at first seemed insuperable. Fortunately all his life he had been tempted by difficulties, and the worse

things seemed to be going the more his determination to overcome all obstacles grew. All through his career those working in close contact with him would smile as they saw him gradually losing interest in a particular venture, for it was a sure sign that that job was now on its feet and needed no further nursing or cursing. He was never overwhelmed by adversity or criticism - let people say what they liked, he had work to do and, as long as he was true to his ideals, nothing anybody could say or do impressed him over much.

Early notebooks, filled with long-hand notes, show the painstaking investigations he applied to any task which faced him. In the case of the supply of electricity, old notebooks, dated as early as 1919, contain outlines of the idea of a public utility company supplying at cost. Once the actual task was in his hands he studied every aspect. Difficulties were written down and different solutions suggested until finally the conception of the Electricity Supply Commission developed. His problem was to provide a

cheap and efficient supply of electricity in a sparsely populated country, with small towns and villages many miles apart. Lack of capital was the biggest difficulty of all. No private company would supply electricity to all these isolated places without expecting a large profit on their investment, but if profits were to be allowed for, the price of electricity would be prohibitive either for domestic or industrial purposes. A vicious circle indeed. On the other hand, if the Government undertook the supply it would mean a monopoly and consequent loss of efficiency, and this would also prevent municipal schemes from going ahead on their own.

He had seen the possibilities of electric power at work in America, the lack of it, in those early days, in England, and he wanted South Africa to profit by his experiences. Gradually the idea of combining both private enterprise and state control, took shape, and in 1923, the Electricity Supply Commission was formed. It was, as H.J. had planned, a mixture of State

control and private enterprise and its functions were to supply electricity for the development of industry, to domestic consumers, to the Government and the Government-owned Railways and to any other consumers in South Africa. It was empowered to investigate new or additional facilities for the supply of electricity and for the co-ordination and co-operation of existing electricity undertakings so as to stimulate the provision of cheap and abundant supply of electricity throughout South Africa. No wonder H.J. was determined to make it go. The Commission had no monopoly and was to be operated at neither a profit nor a loss. The whole idea was something quite new and, of course, raised storms of criticism and opposition. South Africa is a land where opposition thrives and is very voluble. How the sceptical onlookers smirked and stood ready waiting to say "I told you so" if the idea proved unworkable.

"How", they asked, "could any undertaking deprived of the profit-making incentive of all

business, be run efficiently? “However, it did work - so well that it is now held up as an example of how public utility companies should be run.

It would be wrong to give the impression that there was nothing but opposition - although the opposition was noisy enough to drown the words of encouragement - there were many firm and loyal friends who had faith in the new venture. H.J. has never lacked loyal helpers nor has he had to seek far for financial backing for his plans. He has always maintained that his schemes all have to pass through the “slough of despond” before they make any progress. He has lived through many a harrowing few months not knowing whether this or that particular new venture will really make the grade as usual or whether “this time” he is fighting in vain. During such times he has always been surprised and grateful for the faith of his friends for he has never “lost a baby yet” and has always been able to raise just that extra capital necessary to turn the tide, even when it

has appeared to the less hopeful that this time it is just a case of throwing good money after bad.

The fundamental conception of the Electricity Supply Commission was sound, in spite of the opinions to the contrary. The fact that the idea had not been tried before did not deter H.J. There were obvious advantages in combining the best of both State-controlled and private enterprises and H.J. was more than willing to exploit those advantages to the full.

One of the chief advantages of having the Electricity Supply Commission partly State controlled was that the initial capital could be borrowed from the Union Treasury as it was required. The Commission actually borrowed a total of £8,000,000, on which it paid 5.018 per cent interest. Although the payment of interest at this high rate placed a heavy financial burden on the Commission before any of its undertakings were in production, it had the advantage that the money was available at a time when the public were not prepared to

back such a huge financial venture. During the first ten years of its existence the Commission actually paid to the Government over two and a half million pounds in interest and loan raising costs - so the loudly squealing taxpayer did not lose on the deal.

On the other hand the Commission was not considered to be, nor was it operated as a Government department. Government control consisted merely in the fact that the members of the Commission were appointed by the Governor-General and could be replaced by him. These and the Commission's auditors are the only appointments made by the Government. For the rest, within the framework of the Electricity Act, the Commission is operated in the same manner as any private business concern.

H.J. had no wish to deter private interests from supplying electricity nor to enter into competition with them. His aim was to give South Africa an abundant and efficient supply of electricity at the cheapest possible rates, and to

encourage by this means the development of industry, and to give to her people a clean and versatile servant whose potentialities had only, just begun to be realized.

When the Commission was first formed, the only large electricity supply system in South Africa was owned by a company called The Victoria Falls and Transvaal Power Company, Limited. This company was then supplying power to the gold mines of the Witwatersrand and to most of the towns along the Reef. It owned four large power stations which were inter-connected and the electricity was distributed over a grid system extending for many miles. This was one of the first, if not the first, of the large grid systems in the world and this same idea has continued to be used very successfully by the Commission and was adopted years later in America and Europe.

The V.F.P. Company held a charter for supplying electricity to the mines, but it was decided that at the expiration of the charter, this company should be incorporated into the

Electricity Supply Commission. Provision was, therefore, made for this in the Electricity Act in 1922. In the interim it was agreed that the two concerns should work hand in hand. To facilitate the eventual expropriation it was agreed that the V.F.P. Company should not build any more power stations but that the Commission should undertake the financing of any future extensions. Any new power stations and power lines necessary for supplying the ever-growing demands of the gold mines would be financed and owned by the Commission but would, nevertheless, form an integral part of the V.F.P. Company's system and be operated as such. The first two power stations built to implement this scheme were at Witbank and later at Klip - the latter is the largest power station in the Southern Hemisphere. The immediate result of the collaboration of the V.F.P. and the Commission was that the mines of the Witwatersrand soon found themselves paying only 0.29d. per unit for their electric power as compared with the former price of 0.525d. per unit.

The V.F.P. has now actually become part of the Electricity Supply Commission. The date of the expiration of the charter is 1950, but H.J. visualizing the difficulties inherent in expropriation and the fact that it might possibly detrimentally affect the flow of overseas capital to South Africa, approached the Government with the idea of an outright purchase of the V.F.P. Company. This he felt was the more equitable method of handling the matter. His advice was accepted and the Electricity Supply Commission has just purchased the V.F.P. Company for fourteen and a half million pounds. The present plan is for the V.F.P. to continue to operate with its present staff, as a separate unit, but as a subsidiary of the Commission. General policy matters, such as the non-profit factor, and the like will now be co-ordinated but staff arrangements, pension fund, leave regulations, etc., will not be disturbed. This H.J. feels will facilitate the change over and cause little inconvenience to anybody.

But to return to the early days of the Commission. After ten years of successful operation it became necessary to raise further capital for extensions. H.J. decided that the time was now ripe to test the public's reaction to his Escom and to see whether, in addition to obtaining the additional capital required for the extensions, sufficient money could not be obtained to enable the Commission to repay the Government loan of £8,000,000. He decided not to follow the usual precedent of floating all large loans overseas, but to try to raise the money in South Africa. His first try was for £500,000 and was immediately successful and the issue was over-subscribed long before the lists were due to close. The next loan, floated the following year, was more ambitious, and was for £2,500,000. Again the issue was over-subscribed. Now H.J., being anxious to repay his loan of £8,000,000 to the Government, decided it was time - really to test the public, and his next issue of Escom stock was £6,750,000, the largest loan up to that time which had ever been floated in South Africa.

The Banks refused to underwrite the whole amount, but this did not deter H.J., for under his agreement with the Treasury he was permitted to repay his borrowings from the Government in amounts of not less than a quarter of a million and it was not imperative for him to obtain the whole amount at once. However, his hopes and faith were rewarded, for within forty hours the whole of the £6,750,000 was fully subscribed and the lists closed - South African business men were convinced of the soundness of the Electricity Supply Commission. This was in 1934.

Thus the Commission was able not only to repay its eight million loan to the Government but to finance its proposed extensions as well.

At the time the Commission paid back the original loan, the South African Government had to decide how best to use the money. Mr. N. C. Havenga, Minister of Finance at the time, decided to act upon the advice of the then Secretary for Finance, the late Mr. G. G. Hubball, and to use the money to pay back the

remainder of South Africa's war debt to Britain, which was also eight million pounds. The British Government had very magnanimously offered to write off this debt, but the Union Government, under the leadership of the late General Hertzog, decided that in fairness to the British public, they could not accept this generous offer, so the eight million pounds which had seen the Electricity Supply Commission safely on its feet, was eventually handed over to the British Treasury.

It is interesting to note how confidence has grown with the years, for the latest loan of the Electricity Supply Commission, made just recently, was for fifteen million pounds and was over-subscribed within three hours.

The Electricity Supply Commission was established to render a national service and, beyond meeting its fixed financial obligations, not to make profits. The real benefit to the country derived from the establishment of the Commission lay not only in the very substantial price reductions effected in the Commission's

own areas of supply, but also in the fact that the pace set by the Commission brought about a healthy rivalry among the urban local authorities, who were encouraged to bring down the cost of their electricity supplies and so to stimulate the use of what H.J. considered "the most valuable agent of modern civilization."

Among the many benefits to the electricity supply industry in South Africa rendered by the Commission must also be counted the assistance given to the smaller suppliers. All municipal or other schemes, either for new power stations or extensions to existing plant, are submitted to the Commission's engineers for their advice and report, thus reaping the benefit of the Commission's vast store of experience.

Only fourteen years after the passing of the Electricity Act, H.J. was able to say, with justifiable pride: "The general average price of electricity throughout the country has been lowered by approximately 50 per cent. and today (1936) South Africa is one of the most

electrically-minded countries in the world. Unelectrified factories are unknown and a steam drive would almost be looked upon as a museum exhibit. Many thousands of homes are completely electrified and the general use of electricity for domestic purposes is commonplace. What else could one expect when electricity costs only about one halfpenny per unit."

Railway electrification is gradually coming into its own. The exigencies of war held up developments but at present there are actually 2,000 miles already electrified and 512 miles under construction. The cleanliness and smoothness of electric traction make travelling over the long distances which have to be covered in this country, comfortable and pleasant.

Now, in 1948, the Electricity Supply Commission is still expanding. Its present capital is forty-five million pounds, all publicly subscribed. Its capital assets are close on to sixty million pounds. It owns a network of twelve large power stations throughout South

Africa with a total installed capacity of 1,660,000 K.W. It is at present building six more stations, the initial installed capacity of which will total 500,000 K.W. Its transmission lines cover over 4,500 miles and the regional system H.J, was so determined to foster has been most successful. An individual station might fail - it might even blow up – but the flow of electricity to industries, factories and homes would continue uninterruptedly without the consumers being aware of disaster.

From the employment aspect alone the Commission's contribution to the welfare of the people of South Africa cannot be exaggerated. Working under conditions as near to the ideal as Dr. van der Bijl has been able to make them, with generous provision for medical benefits, vacation and sick leave privileges and a sensible non-contributory pension scheme, which is described more fully later, over seven thousand South Africans (of whom about 4,000 are non-Europeans) daily fill the offices and power stations of the Electricity Supply Commission.

Calculating an average of four to each breadwinner in a family, the Commission alone has provided for over 28,000 South Africans.

Escom House - the head office of the Electricity Supply Commission - built in 1936, is such a landmark in Johannesburg today and is taken so much for granted that it comes as quite a surprise to read old press cuttings and letters condemning H.J. for even considering so large a building. It was far too large, said the critics. He would never be able to half fill it. The design was all wrong. One well-known architect even predicted that a building incorporating all H.J.'s crazy American ideas would look like a collection of hat-boxes. But H.J. had the courage of his convictions and he had not spent years in Europe soaking in all he could on the subject of architecture for nothing. He had set out, to use his own words:

“to provide an office building which will enable its occupants to work in the pleasant and comfortable environment which is so desirable for performing a maximum of work

with a minimum of effort. The accommodation and amenities of Escom House are designed to inspire its occupants with greater and nobler thoughts and place them in a better position to face those problems connected with South Africa's development that may fall within their purview.”

He had keen and willing helpers, expert in their own particular line, and the finished building is pleasant and attractive with clean-cut, graceful lines. Every office is light and airy and the whole building is air-conditioned. This was one of the first large office buildings to be air-conditioned in South Africa. The basement provides parking space for the cars of the executives and most of the ground and first floors are occupied by the well-named “Hall of Achievement”, which carries in bold lettering on its walls, the “Dedication” of the building, expressing the sentiment of the ideal to which H.J. has devoted his life - not by high-sounding words but by action. This has been quoted before but can well bear repetition, it reads:

“Dedicated to the ideal of cementing together by common endeavour for achievement, all the peoples of South Africa, regardless of race or creed, into a brotherhood of mutual trust and goodwill for the welfare of our country and the glory of Almighty God.”

This Hall of Achievement with its black glass walls and graceful stairway, is used for small exhibitions of electrical and other products. Other unusual features of Escom House are a well designed, comfortable lecture theatre fully equipped for scientific lectures and for the showing of films, and a modern chemical research laboratory.

The problem today is not to keep Escom House filled, but to find room for all the executives assisting Dr. van der Bijl in his many interests. During the war this building earned the flattering title of “the brain centre of South Africa’s war effort.” Far from being the white elephant predicted by the pessimists, it stands

as yet another monument to foresight and large scale planning for the future.

Dr. van der Bijl has headed most of the South African delegations to the World Power Conferences held in various parts of the world. At the first conference, held in London in 1924, he was asked to address the delegates and his words might well be applied in these hate-haunted days we are living through now. He thanked the English engineers for convening the conference and “for bringing together on common ground, even when the nations represented have not yet fully recovered from one of the greatest catastrophes this world has ever seen, all nations who were desirous of or willing to discuss this most important matter (electric power). This is as it should be,” he went on, “because in matters of science and engineering, as in music, which is the only language of all nations - we move in a sphere far above that which teaches us to recognise lines of demarcation between different members of the great human family.”



Six years later, in 1930, Dr. van der Bijl again headed the South African delegation to the Second World Power Conference - this time held in Berlin. Speaking in German this time, he once again expressed the hope that “this institution may become a world power, not merely in a scientific sense but also to bring the nations closer together to establish a better understanding and to weld together in bonds of friendship the elements of the great human family.”

It was during this conference that he was invited to sign the Golden Book of Berlin. This was a very high honour indeed, for only eleven of the 4,000 scientists present were selected for this recognition. H.J., although very sensible of the honour, was horrified when he learned that in addition to signing the book, he and the other ten scientists would be driven through the streets of the German capital in royal state. With his intense dislike of any form of personal publicity, he still thinks back with cold shivers to that ride. The streets were lined

with cheering people and the drive seemed endless. He decided that Royalty, having to face this sort of thing continually, were certainly not to be envied.

In 1936, yet another World Power Conference, held in Washington, was to provide H.J. with a memorable and unexpected experience - this was his presentation to the late President Roosevelt. He has, of course, met many notable people in his life and, at the time, he was not unduly impressed with the Roosevelt administration or the "New Deal". However, when he actually met the President he felt to his amazement that he was in the presence of the most powerful personality he had ever encountered. He has never forgotten this experience, and F.D.R. still stands out as quite the most impressive figure in the galaxy of famous people he has met.

It was at this World Power Conference that he earned yet another honour for South Africa, for out of the three thousand delegates attending

only five were invited to speak and he was one of them.

CHAPTER 5 STEEL

"If your country has coal and iron it has a future."

- Extract from a letter to H.J., in
New York.

"WHAT we dream of today, we shall realize tomorrow," so Dr. van der Bijl wrote in 1927, and during all the years he had been busy moulding his dream of giving South Africa a cheap and abundant supply of electricity - what he regarded as the life blood of industry - he still had not lost interest in his twin hope: steel. In 1928 he was rewarded by being appointed Chairman of the South African Iron and Steel Industrial Corporation, Limited. This Corporation was established by Act of Parliament and empowered to launch the first comprehensive steel industry in South Africa.

“Rewarded” is hardly the word, for here was yet another difficult task. The E.S.C. was getting over its “teething troubles” and going more or less smoothly, and the early opponents had forgotten they were ever antagonistic to this successful scheme. It seemed that all the former critics had left the country. But here was something new - if the launching of the Electricity Supply Commission had caused a storm, this was a cyclone. The scheme was too big, it was State interference with industry, it would need protection and South Africans would have to pay a fabulous price for the finished steel. There were hundreds of reasons why a steel industry in South Africa could not possibly succeed. One perfectly serious article even explained that steel could not possibly be made under South African climatic conditions! Good old South Africa got up in a body and howled. The tax-payers’ money was being thrown away on this scatterbrained scheme and one correspondent asks naively: “And who is this Dr. H.J. van der Bijl anyway, and what does he know about steel?”

One wonders how H.J. ever carried on. Figures were actually published of supposedly authentic contracts for machinery and plant and names given of engineers chosen as consultants, before even the tenders were ready for issue or the body of consulting engineers appointed. It is easy to realize just how all this complicated matters. Production costs were given and compared with imported steel prices before the size or type of plant had been decided upon. Just at this time a letter arrived from America asking H.J. to join a large American company - one of many he had received. A commencing salary was suggested almost seven times that which he was receiving for his dual position as Chairman of the Electricity Supply Commission and of the South African Iron and Steel Industrial Corporation, Limited. For a moment perhaps H.J. almost decided to quit and let South Africa and her electricity and steel go ahead without him, but his deep-rooted ambitions to see South Africa established as an industrial nation, were too strong. This was his land, iron and steel

and electricity were his babies, he would see them through to maturity. He never referred to these offers or even felt virtuous for having chosen the harder road and he laughed at the few who knew and considered him a fool not to accept and go to America. So we take advantage of our men with dreams to sell. Our jugglers of finance can make vast fortunes without having one constructive piece of work to show for their efforts - and how we do admire them for their skill - but our real builders of the future must get along on their ideals and earn our scorn if their schemes are not immediately and miraculously successful.

In 1926 in a speech to the Associated Scientific and Technical Societies of South Africa, H.J. said: "The functions of an engineer can all be embraced in one sentence - the promotion of the well-being of mankind." That was saying a great deal but he sincerely meant it and it explains a good deal of his character. It was one of his fundamental beliefs and he worked to prove its truth.

The art of smelting iron is a very old one and it is thought that iron was known in Egypt some seven thousand years B.C. In South Africa this art was probably imported from the North, and even today there are members of the Venda tribe of Natives still living in the Zoutpansberg area who remember their fathers working regularly with the Venda type of furnace. With the advent of the white man, native smelting died out. European interest in the making of iron and steel in the Union began somewhere about 1860 when an enterprising British firm offered to build a railway from Durban to Dundee, in Natal, to open up the coalfields there, in return for certain concessions as to the use of steel rails to be produced from the iron ore which had been found in the Prestwick area of Dundee. This offer was, however, refused.

Some ten years later, President Burgers, of the Transvaal Republic, interested himself in the deposits of iron ore north of Pretoria, and it is said that he himself took some samples of the ore to Europe for testing purposes.



ISCOR'S PRETORIA WORKS.

For almost twenty years before the passing of the Iron and Steel Industry Act, the possible manufacture of iron and steel in South Africa had claimed the interest of South African business-men. As early as 1909 Sir Robert Kotze (then Mr. R. N. Kotze - Government Mining Engineer) made a report to the Government advocating the building of a blast furnace and steel plant on a moderate scale, with a view to testing out the suitability of the large deposits of ore which were known to exist at Pretoria. A British steel expert - Mr. Harbord - was invited to visit South Africa to investigate the matter further, but unfortunately Mr. Harbord considered Sir Robert Kotze's proposals as premature. The consumption of steel in South Africa at that time (1911) was only 100,000 tons, which Mr. Harbord considered too small to justify the establishment of an economic steel producing unit. He also considered that the Pretoria ores were too highly silicious to give good results.

As a result of all this talk about steel the Transvaal Government decided to help things on by offering for sale large quantities of railway scrap. This scrap was purchased by the late Mr. Sammy Marks, who formed a small company and started a steelworks at Vereeniging - this later developed into the Union Steel Corporation. Even before this venture the Dunswart Iron and Steel Works had been established and was successfully working on a small scale with scrap.

Once when talking over this venture, Dr. van der Bijl remarked: "Sir Robert Kotze first suggested the scheme - then everybody talked about it, and while they were talking Sammy Marks set an example by action."

In 1917 the late Mr. C. F. Delfos built an experimental blast furnace at Pretoria and successfully proved that steel could be made from South African ores - in spite of the South African climate! This furnace had a capacity of only 10 tons per day, but using the Pretoria

iron ore and adjacent dolomite, made over 4,000 tons of satisfactory pig iron.

Running almost parallel with Mr. Delfos' Pretoria experiment, Mr. J. K. Eaton, who had been largely responsible for the success of the Dunswart Smelting Works, arranged for the erection of a blast furnace at Newcastle, Natal. In 1920 Mr. Delfos formed the South African Iron and Steel Corporation, Limited, with a nominal capital of £1,500,000. £500,000 was subscribed and an ambitious scheme was investigated and planned. The difficulty was to raise sufficient capital. In 1922 Dr. van der Bijl recommended that the Government should encourage and assist the steel industry by a system of bounties. The Bounties Act was passed in 1923 granting 15s. per ton on all iron and steel produced from South African ores, provided the works had a capacity of at least 5,000 tons per year. This certainly stimulated the industry to some extent, but what was needed was sufficient capital to establish a really modern steelworks and it was becoming

more and more evident that private interests were not prepared to put up the capital it would require to build a comprehensive works of sufficient size to function economically.

In 1923 General Smuts, who was then in power, instructed the Union Trade Commissioner on the Continent to make inquiries whether other interests could be induced to start a steel industry in the Union. As a result of these inquiries the Government received a reply from a German company, the Gutehoffnungshuette, offering to send out a technical commission to South Africa and, should the result of the investigations be favourable, to build and finance the enterprise in conjunction with British, Dutch and German financial interests. The Government accepted the offer and a technical commission came to South Africa early in 1924. Their report was entirely favourable, and it was recommended that a plant capable of producing 132,000 long tons of finished steel products per annum should be erected at Pretoria, this being considered the

most favourable site from all points of view. The industry would undoubtedly have been established at that time, but the occupation of the Ruhr made it impossible for the Gutehoffnungshuette and its associates to undertake the financing of the scheme.

Further efforts were made to raise the necessary capital in South Africa, but it soon became evident that private interests were not prepared to back the enterprise. Once again the indefatigable Mr. Delfos, still undaunted by his many set-backs, approached the Government to appeal for financial assistance for his Corporation. However, it was not until 1928, that the Iron and Steel Bill actually became law. The Nationalist Government, under the leadership of the late General Hertzog, had succeeded General Smuts' Government in 1924, and this was one of the first measures they introduced. The Bill had a stormy passage and having been passed by Parliament was rejected by the Senate. The Nationalists thereupon called a joint session of both Houses

and the Bill finally became law, and Dr. van der Bijl was asked to become Chairman of the newly formed South African Iron and Steel Industrial Corporation, Limited, and to launch the new steel venture. This was the birth of the now well-known Iscor - H.J. considered that with such a lengthy name, the new industry would be smothered at birth and needed right at the outset an easily remembered trade name. His brainwave, the contraction Iscor, has proved highly successful, just as the contraction Escom for the Electricity Supply Commission, proved more popular than the official title. The Iron and Steel Industry Act provided that the Government would finance a comprehensive iron and steel industry which would incorporate Mr. Delfos' old company, and Mr. Delfos himself became one of the first directors of Iscor, working hand in hand with Dr. van der Bijl until his death in 1933.

H.J. went overseas and with his usual thoroughness proceeded to become expert in the world of steel. Accompanied by Mr.

Delfos, he visited numerous steelworks in England and on the Continent, studying the different processes and improvements in each. He was determined that after all the struggles to establish a steel industry in South Africa, Iscor must have the most up-to-date and economical works possible.

It was during this visit to London that H.J. was asked to address the Royal Society of Arts, and his paper, entitled "The South African Iron and Steel Industry," earned for him the medal of that Society.

The record of the discussion which took place after he had concluded his paper, makes interesting reading today. (See *Journal of the Royal Society of Arts*, March 29th, 1929.) Mr. Frank Cooper is reported as saying that the only matter not mentioned in the paper was the amount of care and thought which had been put into the scheme. "By now," he said, "the lecturer and Mr. Delfos must be walking encyclopaedias of everything that had happened or was happening in the iron and

steel industry in the world, and when the proposed new plant was opened he was perfectly sure that it would not only be a credit to South Africa but a credit to the Empire."

On the opposition side was a Mr. J. C. Fraser who, apparently, was entirely against the whole scheme. "In my opinion" he is recorded to have said, "a great market for the products of an iron and steel industry in South Africa is merely a dream." "The lecturer," he went on to say, "has entirely failed to state where the markets for his iron and steel products are to be found. The Union contains 1,750,000 white people. What a market for which to start an iron and steel industry!"

To ordinary folk this criticism must, on the face of it, have appeared eminently justified, for there were only very few industrialists who really foresaw the development ahead of South Africa.

This very human tendency to play safe and under-estimate rather than over-estimate the

demands the future will make, always reminds H.J. of a classic example which occurred when he first returned to South Africa as Technical Adviser to the Government. Early in 1922 he estimated that the consumption of petrol in South Africa would more than double itself within five years. An article immediately appeared in the press ridiculing this over-optimistic estimate. The correspondent maintained that as there were already 10,000 cars in Johannesburg, a state of saturation had been reached and further importation of cars would merely be for replacement of worn-out vehicles. He maintained, therefore, that the estimate of petrol consumption made by van der Bijl was far too optimistic and was clearly unfounded and unreasonable. Yet long before the five years had passed, the petrol consumption in South Africa had more than doubled itself and continued to increase by leaps and bounds, and at the present time there must be well over a hundred thousand motor vehicles in Johannesburg alone.

The gloomy forebodings of steel consumption were equally incorrect for extensions to the Iscor Works were in progress even before the original plant was in full production and the problem has been not to find markets, but to distribute fairly the steel available against the ever-increasing demand.

At the outset H.J. was determined that Iscor was not to become a financially powerful corporation for the purpose of competing with existing industries already established in the Union. The whole idea was to establish a basic steel industry which would stimulate industrial growth generally and attract other industries. He was convinced that once Iscor could offer the primary steel products, private enterprise would not be slow to seize the opportunity to establish all the many industries dependent on steel.

With what high hopes he set about his new task but once again his path was beset by difficulties. He battled with one set-back after another and Iscor finally came into production

during one of the worst depressions South Africa had seen. Belgian steel was being dumped in vast quantities at below production cost. Interest on the capital borrowed from the Government piled up and, in the first year of operation, before all the departments had got going properly Iscor showed a loss of over a quarter of a million pounds - enough surely to daunt the staunchest heart. Even death joined the opposition and claimed three of the Doctor's ablest helpers - Mr. A. K. Reese, the consulting engineer responsible for the design of the Steelworks, Mr. W. P. van Dalsen, one of his oldest friends and Iscor's secretary, and, later, Mr. A. C. McColm, who had worked with the Doctor through the early years of the Electricity Supply Commission to become eventually general manager of Iscor and, just before his death, Deputy Director-General of War Supplies.

As usual certain newspaper elements, glad of the chance to criticize, started yet another campaign. H.J., tired at last of all the ill-

informed destructive criticism, hit back with force. At a speech delivered at an annual banquet of The Association of Certificated (S.A.) Mechanical and Electrical Engineers, held in October, 1935, he said:

"I have on former occasions been asked to say something about the steel industry, but I have usually refrained because I do not believe that one can accomplish much by talking, especially when one should be working. But the time has come for me to make a statement and I do so willingly because I am speaking to engineers - to men who appreciate and understand the problems and difficulties involved in establishing industrial undertakings. I wish to refer particularly to the recent frantic outburst of criticism in part of our press against Iscor, against me and against the Government. I say part of our press, because not all the newspapers associate themselves with the rubbish that has recently been published about this great undertaking. Thank God,

South Africa has not yet sunk to that level. Some of the press has been eminently fair and I do not object to fair constructive criticism. I am perfectly willing to take, as chairman of the company, the responsibility, as I have always done in the past. I must again stress that the Iron and Steel Corporation is not a Government Department, but a properly constituted share company. The fact that the Government underwrote the share issue, and was obliged to take up the bulk of the shares, does not make the Corporation a Government Department. It merely makes the Governor--General the majority shareholder. If the Government saw fit thus to assist financially in the establishment of what has now become a national asset of no mean value, it only proves the wisdom of the men at the helm of the State.

“When one reads some of the criticisms and references that have been published recently, one is led to believe that the people of South

Africa are against the undertaking to establish an iron and steel industry and the man in the street is led to believe that the undertaking has turned out a fiasco. But I can give you the assurance that by far the majority of the people of South Africa are solidly behind me in my efforts to make a success of this undertaking. I shall persist in my efforts to make it a complete success, if for no other reason than not to let down these hundreds of thousands of people who think of the welfare of South Africa.

“I received this week the opinion of a steel expert in England, who knows what is happening at Pretoria. He is a man who has probably seen and studied more iron and steel works in Europe and America than anyone else I know of. His opinion is that what has been accomplished at the Pretoria Steelworks constitutes a record achievement in the world’s iron and steel industry.

“Be it remembered that Pretoria was 7,000 miles away from the next steelworks, it was

7,000 miles away from steel expert engineers and operatives and 7,000 miles away from the manufacturers who were to supply and build the plant. The whole undertaking was built on virgin soil - we were not even sure of our raw materials. Transvaal coal was believed to be uncokeable; the choice of the most suitable iron ore deposits had to be made and the problems of mining development in wild country had to be faced and solved.

“The Works were eventually completed and it is just a year ago that all producing departments got under way and now in spite of all our initial difficulties, every department is producing considerably in excess of the guaranteed capacity of the plant. We are selling all the steel we can make, and since last July we have been making substantial profits. As far as South Africa is concerned, the benefits of the steel industry are already considerable. Several important subsidiary industries have been

established as a direct result of the advent of Iscor - and this is only a beginning.

“When in the face of all this one must still breathe this discouraging atmosphere created by some press references, you will understand why I warn you that South Africa is a difficult country in which to try to do anything big.”

Fortunately H.J. was not easily daunted. One by one the problems were solved and Iscor began to flourish. The industries he dreamed of gradually began to develop on his “steel foundation,” so that when war came in 1939, South Africa was able to make her contribution to the Allied effort. How the Union could have weathered the storm without Iscor is a terrifying thought, for without our own steel our contribution towards the war effort would have been all but negligible.

At first dumping was a really serious problem and H.J., loath to apply for the imposition of the usual type of dumping duties, worked out the

now well-known C.I.F. scheme, which gave the new industry the necessary breathing space and thwarted the organized and deliberate attempt by certain Continental steel interests to strangle the new works at birth, and yet avoided the usual pitfalls inherent in the application of dumping duties. The duty imposed, calculated on the home consumption price of steel in South Africa, protected the new industry from all forms of dumping and automatically protected the South African workman from unfair competition from low wage-earning countries.

The problem of the lack of skilled artisans was solved by importing basic crews of trained men and offering them a premium to teach South African workers. In a very short time “it can’t be done” had become “it is being done” and the South African boys were turning out first-class work in record time.

The difficulty of obtaining trained departmental heads was solved in a similar way. When the main contracts for the steelworks plant were placed, H.J. stipulated that each successful

contractor must undertake to train one or two young South African engineers in steelworks practice. A number of specially selected young students with B.Sc. engineering degrees were chosen and sent overseas to learn all they could. It is gratifying to know that all, except one, made full use of this unique opportunity and returned to Pretoria to fill key positions and render valuable assistance to Iscor. These young students were so keen to learn and to absorb ideas that they became known in England as “van der Bijl’s forty thieves.”

H.J. might say simply “we were not even sure of our raw materials.” But what a wealth of work and anxiety went into the making sure. He was determined to make steel which would compare with the best steel produced anywhere in the world, so he had to make quite sure his raw materials were all they should be. Experts had said that Transvaal coal was uncokeable and could, therefore, not be used for steel making. If Natal coal had to be used and transported over the long distances from the

collieries to Pretoria, production costs would immediately increase. A small experimental coke oven was, therefore, built at Witbank in the heart of the Transvaal coalfields and there for fifteen months extensive and intensive tests were carried out using different combinations of coal, until at last it was found that a suitable steelworks coke could be made by using 75% of the Transvaal coal and 25% of coal from Natal. As a matter of fact when the coke ovens were actually in operation in Pretoria, the results obtained far surpassed even H.J.'s own optimistic hopes. South Africa possesses prodigious quantities of iron ore, but naturally the quality varies considerably. The deposits adjacent to the steelworks at Pretoria were highly silicious, so here, too, intensive investigations were carried out, until it was finally decided that the best results would be obtained by using a mixture of the Pretoria ore with a very pure haematite ore obtained in almost unlimited quantities from one of the deposits acquired by the Corporation, situate at Vliegpoort, on the Crocodile River.

Deep in the bushveld of the Northern Transvaal, this deposit was 28 miles from the nearest railway siding at Northam, and on his first visit Dr. van der Bijl got completely lost in the bush and spent over twelve hours locating it. Before one ounce of this precious ore could be sent to Pretoria it was necessary not only to build a railway line, but also to plan a small town to house the mine-workers and their families. Thus around this veritable mountain of iron there grew a self-contained modern little town, which H.J. called Thabazimbi (an adaptation of the native translation of "Mountain of iron"). Nestling on the mountainside, Thabazimbi today is quite a substantial community with its modern homes, recreation club and beautiful park. It also has two fine hospitals - one for the European and one for the Native residents. When this Native hospital was being built, H.J. with a couple of the Iscor engineers, spent a night at Thabazimbi proposing to rise at dawn the next morning to climb the mountain of iron and plan on the spot the best mining methods to



MINING ORE AT THABAZIMBI.

be employed. The building had been roofed in, but still lacked doors and windows. It was the only building available at the time and contained a few iron bedsteads - the first equipment to arrive. Just before falling asleep one of the party thought he felt a movement in his bed so pitched off his blankets and sleepily turned over. As he threw off the covers he thought he caught sight of a lizard's tail but could not be bothered to investigate further. At dawn the next morning when the party started preparing for their climb, they discovered to their horror that the "lizard" was a large rinkhals - a venomous South African snake. This brute, when disturbed from its cosy bed in the blankets, promptly spat into the eyes of one of the Native servants clearing up the "dormitory." Fortunately the camp had been well provided with anti-snakebite remedies and tragedy was averted.

Dr. van der Bijl has always had a deep love for the South African veld and the beautiful trees indigenous to the land. At Thabazimbi, there

were some particularly lovely specimens and H.J. asked that wherever possible the trees were not to be disturbed. One fine old tambotie tree on the mountainside appealed specially to him, but later it was found that this old tree had to be sacrificed on the altar of industry. However, one of the men at Thabazimbi who had a natural genius for working with wood, made out of the old tree a lovely Morris chair which was presented to H.J. as a peace offering. This chair is still one of H.J.'s most treasured possessions, and he maintains that it is the best designed and most comfortable chair in his home.

The investigation and development that had been necessary at Thabazimbi was repeated again and again in varying degrees for each of the raw materials required, until H.J. was convinced he had obtained the best possible for his purpose. It is almost impossible to count the number of times H.J. has tramped over virgin veld, planning and scheming until yet another piece of snake-infested ground joined the list of his developments. The steelworks site at

Pretoria itself was merely a mimosa-covered stretch of veld, so overgrown with bush that the beacons had to be hunted out one at a time.

In spite of Iscor's phenomenal growth and success - its present capital is over £25,000,000 and it employs over twelve thousand Europeans and Natives, H.J. soon realized that the works were not large enough.

"I am aware," he said in 1938, "that I have been accused from time to time during the past 20 years of being too ambitious regarding the size of the projects I have attempted to develop. Looking back over these years, my own self-criticism is that I did not think nearly big enough and my considered opinion is that in a growing country such as ours one cannot think in too big a manner. I can almost hear the Jeremiahs muttering about future competition, cheap steel from overseas and the like. Let me repeat that the development of the steel industry is logical and natural because of our mineral resources. We overcame our teething troubles in the iron and steel industry long ago, and our

domestic prices compare favourably with those in the world's major steel-producing countries. I am satisfied that if the steel industry is pursued with vigour, then the engineering and allied industries will grow apace and there is no reason why our own engineering industry should not compare favourably with that of any other country in the world.

"The development of the engineering industry of the Union must depend to a very great degree on the development and expansion of the iron and steel industry. Were we today in a position to produce a million tons of steel instead of half a million, the steel industry could have been of the greatest service not only to South Africa, but to all our neighbours on this vast sub-continent."

CHAPTER 6

THE TREE OF INDUSTRY SENDS FORTH ITS BRANCHES

As early as 1921 Dr. van der Bijl had said "South Africa should be a veritable work-

shop,” and he liked to think of the industrial growth of South Africa as an enormous shady tree giving shelter and sustenance to the people of the land. The roots he thought of as gold, coal, iron ore, copper, manganese, lime and the almost unlimited mineral wealth so generously provided for us in the soil of our land. Man had only to use his ingenuity in cultivating these roots and up would spring a most wondrous tree - Jack, of beanstalk fame, could hardly have wished for a mightier growth. One of the main tap roots - gold - had already been developed into so vast an industry that South Africa was beginning to take the form of an upturned pyramid, balanced precariously on this point of gold - a dangerous and alarming state of affairs. As early as 1920 when he first returned from America, H.J. had been shocked at the complacency with which South Africans in general were accepting this unstable state of affairs, for as he himself put it: “South Africa’s life is hanging by a thread of gold,” and he determined with all the fervour of youth to do his utmost to develop some of the other roots

and make a more stable structure. He did not under-estimate the power of gold and appreciated the efficiency of the gold mining industry - it was a deep and powerful tap root and looked like holding up the tree for quite a while, moreover it gave him his basic markets so that he could plan not only on sound lines, but on a large-scale production plan.

The trunk of his industrial tree was, of course, steel - good strong steel (preferably Iscor’s) and the life-giving sap would be his cheap and abundant supply of electric power (provided by Escom). The branches he felt would take care of themselves, especially if he gave them plenty of encouragement.

Water, too, he wanted for his tree - water in abundance. He got anxious and annoyed when he found the lack of adequate water supplies holding up the establishment of industries; and in a speech delivered to the South African Institution of Engineers in December, 1933, he expressed his feelings in no uncertain terms.

“Speaking of rain and rain conservation,” he said: “Let me mention that nature is not one bit interested in our ideas of seven-year cycles or thirty-year cycles: she counts her time in units of millions of years. We may be forced to admit that in this respect South Africa has changed in a very short time, but for that we, and not nature, are to blame. The changes that we notice must be expected when our veld is overstocked with animals, mostly scrub, as a result of which the grass no longer grows as it did even when I was a child, and the veld has become as hard as a billiard table, when instead of conserving our rainfall we slowly but surely make things move in the opposite direction. The way in which we have allowed things to drift has become nothing short of a national tragedy.

“It is also heart-breaking when we find that industrialists who think of establishing works in South Africa, works of a nature that require a considerable amount of water, find that they cannot do so because of the lack of water. Imagine lack of water in a country which lends

itself exceptionally well for the storage of water, not only in large dams, but also in large numbers of small and very small dams.”

At this time the proposals for building the Vaal dam had just been published, and he continued:

“I hope that the announcement we saw in the papers this week that the Government has decided to build a huge dam on the Vaal River at Knoppiesfontein is correct, because that would go a long way towards removing one of the main difficulties in the way of developing South Africa industrially. It will certainly be one of those material achievements that South Africa can be proud of and it will be one of those material achievements which are so necessary in an age of material civilization. Only when we have so much material achievement to our credit that we no longer desire to talk about what we were before we were what we are now, can we expect to become a little nation.”

H.J. was, however, not prepared merely to express his “hope” that the announcement about Knoppiesfontein dam was correct, he set to work to make sure that his “hope” would become a certainty. He wanted water for his power stations and all the industries he visualized along the Vaal River, so he arranged that the Electricity Supply Commission, in co-operation with the Rand Water Board and several interested industrialists, would contribute financially towards the building of the dam in return for the assurance that industrial supplies of water would be made available and that all the water would not be earmarked for irrigation.

At the present time the branches of H.J.’s imaginary tree are large and powerful, growing daily and supporting in their turn smaller branches down to the smallest twigs represented by the one-roomed workshop. He has a deep respect for these small twigs and early realized the value of the small industrialist starting out with his skill in his hands, building

gradually and ploughing back his profits until the one-roomed workshop blossomed into a small factory and eventually, if things went well, into a substantial branch of his tree.

He has certainly succeeded in turning the imaginary pyramid right side up, for today South Africa’s gold mining output is only a small proportion of the total industrial output. The approximate figures speak for themselves:-

	1922	1947
Gold mining output	£60,500,000	£96,600,000
Other industries.	79,400,000	418,000,000
		(1946-47)

(Big increase expected for 1947-48, but figures are not yet available.)

Many people held the view that Iscor’s advent would be the death knell of the smaller steel industries, which already had but a precarious existence. In point of fact, as H.J. had stoutly maintained, it had the opposite effect. Take the Union Steel Corporation at Vereeniging. H.J.

had always had a sentimental interest in these works and in the little town of Vereeniging itself, mainly because of his admiration and affection for his father's old friend, Mr. Sammy Marks. In 1929 the Union Steel Corporation was in a most difficult financial position, hardly able to carry on, although Iscor had not yet started production and could, therefore, not be accused of competition. Mr. Louis Marks (one of Sammy Marks' sons) spent long hours with H.J. discussing ways and means for saving the works. Eventually it was decided to increase Usco's capital by one quarter of a million pounds, of which Iscor would subscribe half. Usco would then be developed to produce special lines of steel manufacture such as rock drill steel, copper wire, bolts and nuts, steel castings and, for a time, agricultural implements. From these beginnings Usco developed and grew in strength and stature until today it is an important integral part of South Africa's steel industry.

Vereeniging itself has grown beyond recognition, and clustered around the once small, unimportant village - noted only for its place in South Africa's history and for the Treaty which ended the Boer War, which was negotiated there and later signed in Pretoria - is now a veritable hive of industry. There are factories manufacturing bolts and nuts, operated by the S.A. Bolt and Nut Manufacturing Company; pipes manufactured by the well-known firm of Stewarts and Lloyds; cables made by African Cables; steel chains, manufactured by McKinnon Chain Co.; agricultural implements, manufactured by the S.A. Farm Implement Manufacturers; ferro-alloys, operated by African Metals Corporation; to name but a few. So much for the pessimists, for these many and varied industries, dependent on the parent "steel" have brought untold capital and prosperity to Vereeniging, and the little town often claims - albeit rather diffidently - that it is becoming the "Sheffield of South Africa." Certainly, with the new and flourishing town of

Vanderbijl Park, established only ten miles away, the two should form a formidable district teeming with industry and wealth.

Then there was the little town of Newcastle in Natal. It had optimistically been named after the great industrial town in England, but no real progress had been made, and the small blast furnace erected there seemed nothing but a white elephant. It had been dead for years and even the ever optimistic H.J. regarded it as an almost hopeless proposition. In November, 1933, he said: "As regards Newcastle, I can only say that we are after all, only human and can hardly be expected to do the impossible. However, if any opportunity should arise which would make it possible to resuscitate the Newcastle blast furnace in a manner that is economically feasible, we shall not hesitate to do so." Newcastle decided that if any man could do the impossible, that man was Dr. H.J. van der Bijl, so they kept on reminding him of the sorry plight of Newcastle and of their dreams of justifying their industrial namesake.

H.J. thereupon asked the Union Steel Corporation to investigate the possibility of manufacturing ferro-manganese and foundry pig iron in the old Newcastle blast furnace and to submit a detailed report. The matter was considered from every angle, but the report was most unfavourable. Not long afterwards H.J. decided to launch a new undertaking for the exploitation of the base mineral resources of South Africa. This new venture was called the African Metals Corporation (Amcor) and its avowed purpose was the "development and mining of base metals and minerals, the investigation of the economic feasibility of establishing and operating iron and steel works and other works for the production of ferro-alloys."

In spite of the adverse report he had received, H.J. decided to take a big gamble and in the name of the new corporation purchased the old Newcastle blast furnace and started to use it for the production of ferro-manganese. For a time it seemed that the gloomy forebodings

were indeed correct for the fates were definitely set on putting as many obstacles as possible in the way of this new enterprise. For the first few years things looked very black indeed.

Everything that possibly could go wrong, went wrong, and the little corporation of Amcor followed in Iscor's earlier footsteps and made heavy losses. Murmurs of "I told you so" were plentiful. Even H.J. felt despondent. "It seems," he said at the time. "that everything I touch is doomed," and all but gave up the fight. Adversity had, however, always given him strength to fight and he resolved to find some way out, so with grim determination he set to work to save this new child of his industrial dreams. He inspired his "Amcor boys" with so much enthusiasm that once again the impossible was made possible, and within a relatively short time Newcastle joined the ever-growing list of successes and fulfilled her dream of becoming an integral part of the industrial life of South Africa, for today not only is the old furnace

working steadily but a new and bigger furnace is also in production. This second furnace was built during 1942 when war conditions made it impossible to import the plant, so Amcor set to work and the second 300-ton furnace was constructed almost entirely in South Africa, the barest minimum of material being imported.

At Newcastle Amcor now makes only foundry pig iron, the demand for which has grown far beyond even H.J.'s own most optimistic dreams. When Iscor was established South Africa used only 9,000 tons of foundry pig iron a year, and it was decided that it would be uneconomical to use the Iscor blast furnace for this type of production. Today the demand is in the neighbourhood of 180,000 tons and, anticipating an increase in demand up to 250,000 tons, by 1950, Amcor is busily planning yet further extensions.

All this activity is, of course, attracting more wealth to Newcastle and besides the natural expansion dependent on the activity of Amcor itself other industries are slowly but surely

being attracted. Even at the moment the Durban Falkirk Iron and Steel Company are establishing an industry there for the manufacture of electric stoves, enamel baths and the like.

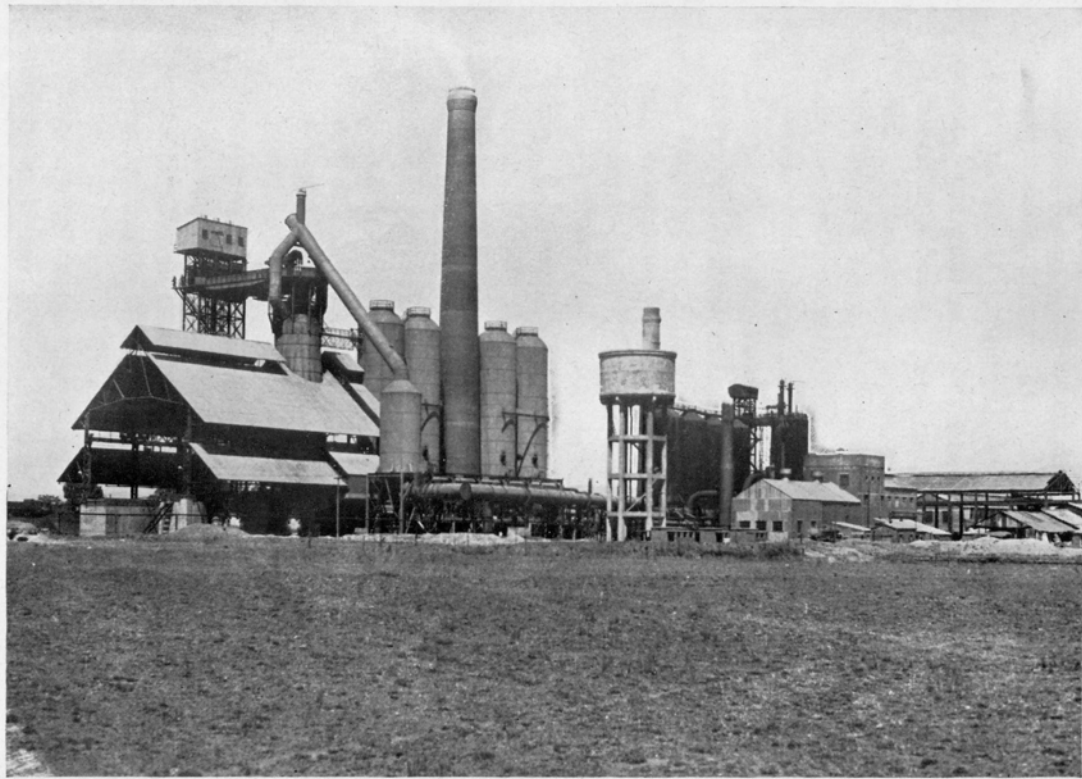
The production of ferro-manganese and ferro-alloys was transferred from Newcastle to a new plant on the outskirts of Vereeniging, and the cloud of pink smoke enveloping the works hangs as a rosy promise against the clear blue of the sky.

Amcor's purpose is to exploit to the full the almost unbelievable mineral wealth of South Africa, and for this purpose the officials of the corporation roam far and wide searching for new ventures, rejuvenating old ones, investigating and reporting on claims and obtaining interests in new and already established workings. The expansion goes on daily, and at present they are busily planning new enterprises on a site near Meyerton in the Transvaal.

No wonder H.J. is proud. Just a short time ago he had taken some visitors from England to lunch and at a nearby table sat a group of young men. Turning to his guests H.J. said: "You see those young men over there ? They are some of my clever Amcor boys and I am very proud of them, for they helped me to turn an almost certain failure into a most surprising success."

He scarcely realizes that it is his own enthusiasm and sympathetic handling of "his young men" that provides the inspiration and makes them his slaves for life.

But to return to the affairs of Amcor. In 1941 supplies of phosphate rock for the production of phosphoric pig iron at Newcastle were completely cut off and Amcor had to set to work to find a South African source of supply. A workable deposit was eventually found near Langebaan Road in the Cape Province. The owner, however, decided that he did not want to sell his deposit and it took H.J. almost a whole



AMCOR'S BLAST FURNACE PLANT AT NEWCASTLE.

day to persuade the old fellow to part with it. It was a burning hot day and H.J. still laughs at the recollection of himself sitting in the little corrugated iron office with the sun blazing down until the small room became almost unbearable. To make matters even worse, the owner served a very potent home-made brandy which fortunately did not unduly affect H.J.'s steady head. Eventually his powers of persuasion prevailed and the owner decided to sell, on condition that he was given a seat on the board of the company. So the deposit of phosphate rock changed hands and the former owner became a director of the company until his death a few years later.

This deposit of phosphoric rock has since been exploited for the purpose of meeting the fertilizer shortage in South Africa. A plant for grinding the rock and turning out a finely ground phosphate fertilizer was rapidly established at Bellville and its production of 50,000 tons annually of an excellent fertilizer known by the name of "Langfos" has been in

great demand and has met with most satisfactory results.

Thus yet another link in the chain of "foundation industries" has been forged and there is another healthy branch on H.J.'s industrial tree.

To understand fully the benefit of the work that Amcor is doing it must be realized that although South Africa has very vast mineral deposits, they are usually low-grade and of poor quality. H.J. has often stressed this fact and has insisted that "if the raw materials are not good enough, we must set to work-to make the very best use of those we have." That this injunction has been faithfully carried out is evidenced by the fact that today Amcor is making stainless steel from very low-grade chrome ore - in face of a world conception that for this purpose only the highest grade raw material could be used. As H.J. frequently quotes "there is no limit to man's ingenuity" - the will to succeed is the driving force and in the face of such a will nothing is impossible and seeming miracles can be made to happen. Once when the lack of large

quantities of high-grade coking coal was given as the reason why South Africa could never be a really great steel country, H.J. replied: "Just wait, before I die, I will make steel without any coking coal at all!"

Even with so much to his credit, H.J. was still dissatisfied. Smaller industries were being established by private interests, but he felt that the progress was not going as it should. In 1934 he approached the Union Government with the idea of getting them to sponsor a Corporation or Company empowered to assist financially and technically the smaller industrial ventures and otherwise to assist new and already established industries to develop along sound economic lines. A central body, he felt, would be able to see the whole view and prevent overlapping and waste and by helping the smaller ventures over the rough patches would have a stabilizing and encouraging effect.

"The machinery for financing mining ventures in South Africa," he said in 1934, "is highly developed, but the country lacks industrial

finance houses such as are found in London, New York and other overseas countries. A medium should be provided for the financing of sound industrial ventures in the shape of new industries, and schemes for the expansion, better organization, modernization and rationalization of existing industries."

However, it was not until six years later - the crowded year of 1940, with war raging and disaster almost upon us that the Government finally decided to act on the idea, provided that H.J, himself would undertake the launching of the new venture. In spite of the heavy burden he was already carrying, for the duties of Director-General of Supplies, had been added to his already full schedule, H.J. agreed to accept this new job for three years. An Act of Parliament was then passed providing for the establishment of the "Industrial Development Corporation of South Africa, Limited," with an initial capital of five million pounds underwritten by the Union Government.

An amusing letter to the press, when news of the new venture was published, comments:

“It would seem that in the game played by our Government, the infallible rule is: when in doubt, play van der Bijl.”

Handicapped as the work of the Corporation was by the exigencies of war, it was a valuable “fertilizer” for H.J.’s tree of industry. The Corporation first appointed technical and financial experts and a thorough survey was made of South Africa’s industrial potentialities and of her man-power resources, both skilled and unskilled. Wages and production costs were fully investigated and a detailed picture obtained of the whole industrial set-up of the country. During the first nine months of its existence the I.D.C. was called upon to investigate no less than 150 industrial proposals, involving an aggregate amount of nearly four million pounds. Each proposal had to be carefully investigated, for as H.J. put it in 1941: “It is not the intention that this Corporation should provide cheap money for the

indiscriminate establishment of industrial concerns, which may lead to mushroom development and undesirable and inefficient production methods.” Its purpose was to promote sound and lasting industrial development.

In his address to the Second Annual General Meeting of the I.D.C. shareholders, H.J. once again reiterated his firm belief that the only way to raise the standard of living of the poorer and less productive sections of South Africa’s population is by industrial expansion to provide essential employment and facilities for greater productivity and earning power. This naturally increases the standard of living and instead of the usual vicious circle of “higher wages - higher cost of living” *ad infinitum*, we get higher productivity, higher earning capacity and increased markets.

In this same address he pleads for a sane and large-scale housing scheme:

“I can think of no scheme that will give such a fillip to industry as a bold housing scheme, in order to provide adequate modern housing for every family in the country. This is a most important outlet for post-war investment and employment. If one starts analysing all the constituents that go to the construction and furnishing of a house, including kitchen and pantry utensils, there is almost no limit to the industrial expansion necessary to meet the requirements of such a scheme.” That was in 1941!

“Industrial development” that was the keynote of his plans and, he believed, might even prove the solution of the international political scene.” Although it would appear that the international political scene is one chaotic muddle,” he wrote soon after “peace“ was declared, “apart from the finessing on questions of ideologies, boundaries, etc., peace and order depend largely in the final analysis on the economic structure which will be built up in the world in the years to come. This world economic structure depends

in its turn upon the industry and trade of the nations. With each nation developing along the lines most suited to it and with no nation endeavouring to prevent the peaceful industrial development of other nations, the stable world economy emerging will, in my opinion, be the strongest factor in helping to ensure a peaceful and progressive world - if this Utopian state can ever be reached. In the foregoing concept each country has its part to play and our own young and developing land no less than any other can and must take its rightful place in the community of nations.”

The war taught him by bitter experience that every part of the British Commonwealth must develop into an industrial stronghold. He felt that with sane development and far-sighted planning, this great Commonwealth of Nations could become a leading power in the world for peace and could prove by its example that unity of effort and similarity of ideals can become a terrific force for the good of mankind.

In 1941 he said:

“The geographical structure of the Commonwealth can be converted into an element of very great strength if highly developed industries are spread out in the various constituent Dominions where raw materials and labour are available. The safety of the Dominions should never, in future, depend to such a large extent on the manufacturing ability of the people in Great Britain, where factories are so extremely vulnerable to attack from the air, and where maintenance of shipping life-lines is of such extreme importance. In the development of this idea in its application to South Africa, the Industrial Development Corporation can be of great assistance to industrialists.”

After the war he again stressed the necessity for South Africa's sound industrial expansion: “The economic future of our young land,” he said, “will depend fundamentally on the soundness of our industrial development. Clearly, therefore, South Africa's industrial development, if it is to be built on sound lines, must be based upon the

natural wealth and advantages which our country possesses.

“From an agricultural standpoint I feel we have not as yet developed very far in making the best use of our land, although in livestock farming and in certain branches of intensive farming, we have done fairly well. Thus with an ever-increasing population we are likely to continue to be substantial importers of grain and cereals while being exporters of wool, tobacco, wines and fruit.

“For many years to come the economy of the Union must be closely linked with the prosperity of the great gold-mining industry. The vast deposits of medium and low-grade coal must be utilized to the best advantage. The highly successful electric power industry is an outstanding example of the advantages which can be won from our coal deposits and the ‘petrol from coal’ industry appears to me to be one of the brighter stars in the firmament of this country's post-war industrial development.”

This “oil from coal” industry is an old love and has held his interest from the early days of 1920, but in the pressing demand of the other interests it has had to take a back seat.

With the post-war development of the Union getting into its stride and with immigrants coming from all parts of the world to contribute their skill and knowledge to the fund of our brainpower capital, the tree of industry is growing from the sturdy young sapling it was before the war, into a mature tree, and it is certain that H.J. will spare no effort to turn it into a veritable “Wonderboom.” Like a weaver tending his loom he watches the threads of his many interests weave themselves into the fabric of his dreams. On a background of gold the pattern of South Africa’s industrial future becomes ever clearer and stronger until, as the hopes of its designer are realized and the flaws of the past are covered over, the whole will emerge like a rich piece of tapestry telling a happy tale of united effort and achievement.

CHAPTER 7 THE IDEALS OF AN ENGINEER

“The functions of an Engineer can all be embodied in one sentence - the promotion of the well-being of mankind.”

- H.J. v.d. BIJL, 1926.

ALL through the years when H.J. was busy planning, organizing and battling to get Iscor and Escom established, his mind was still busy with other schemes and in spite of the fact that now it was his administrative and business ability which was being used to the full, the scientist and engineer still stood firmly behind the executive, and numerous old notebooks are filled with ideas, plans and involved calculations. Ideas for improving a particular piece of plant or how to cut down a costly or involved process, notes on how to use up waste heat or how to save water. New scientific discoveries are commented upon and notes made for their possible future application. He said of Iscor “we intend to waste absolutely nothing and will use up even the squeak of the

pig.” It certainly seems from these old notes that he never tired of trying new ways and means. The smoke nuisance of industries came in for a good deal of attention, and the resulting by-product plant at Iscor was designed to make sure that an absolute minimum of the valuable constituents of smoke would find their way into the air.

How he was ever able to cram so much into twenty-four hours is a mystery. There are ideas worked out in detail, with accompanying drawings and calculations and plans for the better and safer distribution of food; the design of a cheap and comfortable house; improved methods of street lighting, and so on. In short, ideas and methods for improving whatever came his way - the fulfilment of his ideal as an engineer: “the promotion of the well-being of mankind.”

In December, 1933, when addressing the South African Institution of Engineers, he said:

“There was a time when my work was more of a mechanical engineering nature, then came a time when it was more electrical and less mechanical. Now I seem to be getting more of everything else and less of either mechanical or electrical. There is, however, at least one characteristic which I have acquired as a result of my engineering training and which has not yet forsaken me, that is the optimism of the engineer. I am today just as much of an optimist as some thirteen years ago when I returned to South Africa after having made my home abroad for many years.

“I admit that my optimism then was of the type that springs from the fountain of young blood. It must have been, because that was at the time when men, who, to all external appearance, had to be judged as sound and solid, were drawing curves of the rise and decline of the gold mining industry and were anxiously trying to determine the point at which the curve of decline would cut the abscissa of

death. I was becoming apprehensive that the time had come for a second Gibbon to arise and to write the history of the Decline and Fall of the Golden Empire of the Rand. So dissatisfied did I become with my ineffective optimism that I sought consolation in the life of Noah, the Noah of biblical fame. As you know, Noah preached righteousness for a hundred years and never managed to convert anybody outside his own family. But in the end, the flood came and drowned all the pessimists.”

It was in this same speech that he also said: “I believe that the engineer will be called upon to play a role of increasing importance to help South Africa fulfil her destiny. Our civilization is a material civilization for which, of course, science and engineering must be held responsible and, whether we like it or not, if we wish to keep abreast of the world, we must pay more attention to problems that really matter and develop our country in a material way. In this respect we can still today say with Rhodes ‘so much to do, so little done.’ For this reason, I

believe South Africa offers as good opportunities for engineers to work off their enthusiasm as any country I know of.”

He goes on to plead for the application of engineering principles to agriculture in South Africa. Gold mining and agriculture he regards as the two great primary industries of South Africa. Gold mining he describes as “an industry so huge and intricate and so thoroughly well organized that it has reached a peak of efficiency the like of which the world has never seen before.” He fears, however, that agriculture carried on in the old-fashioned way will, instead of becoming a gigantic pillar of strength to South Africa, merely become an increasing burden on the other great primary industry. Is it fair, he asks, to expect one man to be proficient in all of the different branches of knowledge which enter into agricultural production?” It is more reasonable to expect that agriculture might take its rightful and independent place if it were conducted on large company principles, where each company

would own not only one farm, or group of farms, in one locality, but groups of farms in different parts of the country, so as to spread the risks resulting from climatic influences and the hazards of market changes.”

Earlier that same year - 1933 – he had discussed this matter of the reorganization of the agricultural industry with the late Mr. Kingston Russell, who was very much interested in the idea and wrote asking him to give a brief outline of the proposed scheme. In his reply H.J. pointed out that he could not possibly give the time to the working out in detail of such a vast scheme and that numerous difficulties might be encountered in applying the idea, but he said “taking agriculture as covering the whole of South Africa, it is, from a national point of view, a profitable business, because the revenue accruing to the whole country from farming is usually greater than the expenditure and it should, therefore, be possible to run a large farming corporation or corporations profitably and successfully.

In this letter he further points out that his scheme could not be considered revolutionary as there would be no compulsion about it, and contrary to the Russian Kolhozi method, it would not aim at the destruction of the home. It was merely the application of large company business practice to the industry as a whole. Any farmer could join the company if he wished, selling his land to the company and retaining his home with a few acres around it. Then, if he wished, he could join the staff of the company on a salaried basis and continue to work the farm, or a portion of it, but now with the benefit of working capital behind him and acting on the advice of the company’s experts.

The application of this idea, he felt, would also solve many distribution problems, especially if the corporation were run on the same principle as Escom, that is, on a non-profit making basis. In this way profits would be used to bring down the price of food or would be “ploughed” back into the ground,

improving crops and methods of farming. Individual effort would in no way be discouraged because the man with brains and determination would naturally rise to higher position and responsibility for which he would naturally receive higher remuneration.

In his own field of industry the sociological aspect of employment has always been of great interest to H.J., and in spite of his many commitments, the welfare of his employees has been his first concern. He always maintains that his interest in keeping his people healthy, contented and happy is purely utilitarian and he states firmly his belief in the principle "In this world nothing for nothing." There have, however, been too many instances of just plain kind-hearted generosity on his part to disprove his contention. His desire to improve living conditions springs rather from his inherent sense of fairplay and dissatisfaction with the old order. He himself has said "any plans or schemes concerning the welfare of the people

must be based on sociological lines - we have tried the other experiment too long."

As the number of employees in his various undertakings increased, he studied carefully all the ramifications of their living conditions. He investigated public health and welfare schemes, medical benefit plans, pension schemes and the like trying always to remove discrepancies and improve old methods. As an instance of the care and thought he gave to each problem, the pension scheme finally decided upon for the Vanderbijl group of companies, can be cited as an example. As a rule pension schemes are so applied that once a man has contributed to the fund for a number of years, it becomes uneconomic for him to change his employment. Even if he is capable of holding a much bigger job than any available in the firm that employs him, he must remain stagnant for years wasting his brain and capabilities rather than sacrifice the financial benefits of his pension fund contributions.

Another unfair aspect, in his opinion, was that most pension schemes provide that the higher salaried groups were automatically entitled to the higher pensions. This H.J. considered was putting the cart before the horse; for, he argued, men with high salaries are in a position to provide insurance for their old age, whereas a man with a growing family trying to live on a small salary needs every penny for present living. The final pension scheme evolved and applied first to the employees of the Electricity Supply Commission and later to all the companies coming under his control, was designed to rectify both these anomalies.

This pension scheme is non-contributory and is based on length of service and salary, but is calculated on a formula which gives the lower income groups a higher percentage than the more highly-paid staff. Moreover, once an employee has served ten years with any company of the group (medical, pension, leave and other privileges are interchangeable within the group) he or she receives a pension

certificate for the amount earned to that date. Thereafter the certificates accrue annually and become payable when the employee reaches the age of 60, irrespective of whether he or she is still with the group or not. In this way there are no unnatural shackles put on the brain-power of the country and a man can seize outside opportunity without financial loss. The loss of efficiency caused by malnutrition, overwork and worry, caused H.J. to delve deeply into these problems. He has always maintained that South Africa is essentially a poor country and the living conditions of the majority of her people are a disgrace and an insult to the intelligence of her leaders. He soon learned from experience that even after years of malnutrition and squalor, rehabilitation could be truly amazing. During the depression of 1930 it was decided to try the experiment of employing unskilled European lads at one of Escom's power stations. A building capable of housing forty of these boys, two per room, was prepared and equipped with kitchens, dining rooms and the like. The services of the local

medical officer were obtained and he was asked to work out a nutritious feeding scheme. Then with the co-operation of the Labour Department, forty boys were selected and sent to work. H.J.'s own words graphically describe what followed:

“The boys duly arrived. My heart sank. Merely to look at them was enough to dispel all hope of getting any sort of man's work out of them. Our medical officer had to make an even more exhaustive study of food values. Within a month the forty lads displaced eighty natives and after three months some of them were counted among the best footballers in Northern Natal.”

This experiment made H.J. determined to see that, as far as in his power lay, he would make sure that his employees were able to be properly nourished and restaurants providing hot, well-balanced meals at low cost are a feature of most of his factories.

He had proved by his own intensity of effort that “all work and no play, verily made Jack a dull boy,” and annual vacational and sick leave on full pay, medical benefits and recreational facilities are provided for employees throughout the group.

When Iscor first started, H.J. soon found that although the rates of pay were good, the employees were being forced to pay exorbitant rentals and were living under unpleasant and overcrowded conditions just to retain their jobs. This was another contributory factor to ill-health, discontent and inefficiency, so he set to work to solve for his employees this most important problem - the provision of good housing at the lowest possible cost.

He decided that in order to make a success of any housing scheme, the first essential was to obtain money at low rates of interest. It was no use using shareholders' investments for this purpose, because shareholders demanded a high return on their capital, and the provision of cheap housing and the earning of large

profits was naturally incompatible. He decided that the solution would be to have the building programme handled by a non-profit-making utility company on the lines of Escom, which could build at cost and pass on to the tenants the benefit of economies which would be made possible by large-scale building programmes. He immediately set to work to test out this idea.

In the case of Iscor a subsidiary company was formed, called the "Iskor Housing Utility Company," a non-profit making company which set to work immediately and has been responsible for building hundreds of houses in Pretoria, Thabazimbi and Vanderbijl Park. These houses are let to employees at rentals commensurate with their wages. Living in the houses provided by the Housing Company is entirely at the option of the employees and, as an alternative, facilities are made available through the company for the granting of loans to enable an employee to build or buy his own home. This money is loaned to an employee against the security of a mortgage bond, and

interest is charged at below current rates. The whole amount loaned must be paid off within a period of twenty years or on or before the employee's sixtieth birthday, whichever is the earlier, and collateral security in the form of an insurance policy must be provided.

In order to bring down the cost of building homes for his employees, H.J. studied the question from every angle. The usual South African method of building in brick was substantial and solid and had its advantages, but it was also expensive and slow. In one article, he wrote:

"The standard method of building houses has become an old and well-established art. It has changed little in its march through the years and, therefore, it does not meet modern requirements. If automobiles were built today as they were built forty years ago, very few people would own an automobile. The price would be too high and they would not have the utility they have today. If anything like the same engineering effort that made the modern auto-

mobile possible had been applied to the building of houses, the position would have been very different today. But it just was not done.”

As usual he was more than willing to try out experiments with new methods of construction, learning from actual practice the value and faults of each. Prefabrication of as many parts as possible was a sure way of speeding up work and reducing costs and he welcomed any new method or innovation that would assist in this direction.

The brick-laying controversy with its perpetual chorus of “How many bricks can a man be expected to lay in a day?” made him wish that this method could be abandoned. “If only,” he writes, “bricks could be made cheaply to exact sizes and shapes, not necessarily of clay, the laying of bricks would become a relatively simple matter, and if a suitable adhesive could be found for tying such bricks by a simple brush application, the building of walls would merely become a matter of stacking.” “This,” he adds,

“is a bit like the old joke ‘if we had ham we could have ham and eggs, if we had any eggs!’” He found comfort, however, in the words of the great astronomer, Galileo, who once said:

“Who shall set a limit to the human mind.” This is an engineering and chemical problem, the solution of which would go a long way towards simplifying the building of houses.

Building in concrete was, however, nearer reality than his dream bricks, so attention was turned to the construction of houses in this medium. Timber shuttering was expensive so steel shuttering was substituted - H.J. himself invented a type of steel shuttering suitable for this purpose and extremely simple and economical to use.

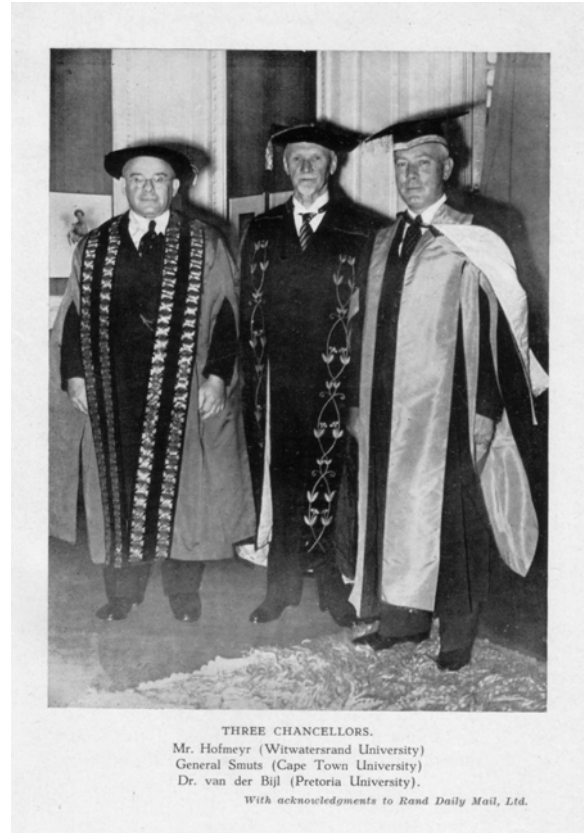
Time has proved the value of these experiments, and in 1945 Iscor built thirty concrete houses at a cost of £1,279 each, or 14s. 42d. per square foot, including overheads but excluding profit. These houses comprise three bedrooms, living room, kitchen with sink and

hot-water installation, pantry, bathroom, with enamel bath and basin, two sewerage points and outbuildings measuring in all 1,783 square feet. These houses have standard ceilings, corrugated iron roofs and parquet flooring. With two sets of steel shuttering specially designed for the purpose, two and a half houses can be built in one week. The equivalent house in brick, with the same accommodation, costs £1,996. This does not mean rows of identical-looking houses. Four or five different standard plans suitably alternated with variations in external appearance give variety. Just recently H.J. stressed the fact that with timber likely to be in short supply for some considerable time, it was necessary to find a suitable substitute for wood in the building of houses. Steel, the obvious answer, is also in short supply, but that, in his opinion, is no reason to accept the problem as insoluble. Again he quotes Galileo's "Who shall set a limit to the human mind?" and appeals to the engineer, the physicist and the chemist to set about solving the problems.

The welfare of the non-Europeans employed was also carefully considered. Unfortunately with conditions as they were it was necessary to house the Iscor Native employees in compounds, which H.J. maintains is "a system of housing which cannot be too strongly deprecated for permanent institutions not using indentured Natives." But in considering Native housing H.J. was up against the old national problem of allowing natives to become skilled builders. "It is a crime" he says, "to pay a man four shillings an hour to build a house for a man who earns four shillings a day, but I doubt the wisdom of the idea of attempting to train Natives in the art and skill of building houses by the ordinary established methods, unless we are willing to prepare for relegating eventually practically the whole of the building trade to non-Europeans." To solve this problem he devised a method of building compact concrete houses which required a minimum of skill and supervision and yet produced a satisfactory type of house. He actually built an experimental house, with the steel shuttering

he had invented to test out this method, and time is proving its worth. Unfortunately the intervention of war prevented large-scale experiments, but plans are now being developed for the construction of thousands of houses for married Natives in close proximity to his factories and works, but segregated from the European sections. Every married Native who wishes to have his family with him will be encouraged in this direction. The houses will be erected in scientifically laid-out townships, and all essentials will be made readily available to the resident Natives. Recreation facilities and health clinics will be provided for each township.

Even under the system of compounding, the health of the four thousand Natives employed by Iscor has steadily improved and with the clean housing and scientific feeding provided, the incidence of sickness is now almost nil and the Native hospital, once filled with ailing humanity, now deals mainly with accident cases.



Among H.J.'s many duties is also the Chancellorship of the University of Pretoria and on the occasions when he has addressed the students of the University he has tried to pass on to them his own enthusiasm and idealism. "Do not pride yourselves too much on the knowledge you have so far acquired" he told them on one occasion. "if you have been given the right kind of tuition, which I am sure is the intention of the University, you will so far only have learnt how to think and how to acquire knowledge." Then he went on to tell them that they, having enjoyed the privilege of a university education, should aspire to greatness—greatness in the service of their country and their people. He warned them of the difficulties attendant on such aspirations - how well he should know them - and advised them to cultivate a sense of humour to tide them safely over the worst patches. On several occasions he has warned these "guardians of the future - the students of our universities" that the real problem of the student is how to acquire knowledge without becoming a slave

to it." Do not be too eager to believe what you read," he warns them. "Read with a critical mind and think for yourselves and if reading puts ideas into your head, so much the better. Give vent to them and you will learn to act and think." In 1934 he warned the graduates who had just received their degrees from him, that South Africa was in dire need of the creative type of mind. "Things are not well with South Africa," he said. "We may pride ourselves on what we have achieved with our relatively small population and in some respects we have achieved much. But the fact remains that America was discovered at about the same time as South Africa and Australia was settled after the Cape had become the half-way house to India, and of the three countries South Africa is the most backward. The very continent that requires the strongest outpost of civilization, that should now have benefited to a very noticeable degree at the hand of South Africa, is still left with but a handful of Europeans who have not yet begun to try to

understand the many millions who inhabit the rest of our continent.”

From the depth of his own experience he gave them the key to his own unstinting efforts for the benefit of his fellow South Africans:

“Whatever else you do,” he said, “you will find that you derive the greatest pleasure from those of your actions and undertakings that create opportunity for others to reduce poverty.” H.J.’s title is very impressive. It reads: H.J. van der Bijl, Ph.D., F.R.S., LL.D., D.Sc., M.Am.I.E.E., F.I.R.E., F.R.S.S.A., etc. and none of these are phantom honours or honours bought with gold - they are each and every one a reward of achievement.

The F.R.S. (Fellow of the Royal Society of London) is one of the highest honours that can be bestowed - it has been called the V.C. of science. This Fellowship was conferred on him during the war, but it was not until 1945, when he was in London that he was able to sign the charter book of the Royal Society, which dates

back to the year 1660. At the actual ceremony the unexpected thunder of applause as he stepped forward to sign made him all but lose his nerve, and he inwardly cursed his long signature as he summoned his courage to write it legibly with the special pen and indestructible ink on the old parchment.

In 1943 the American National Academy of Science conferred on him their highest honour by making him a Foreign Associate of the National Academy of Science of America. This is the American equivalent of the F.R.S.

In 1937 the Koninklijk Instituut van Ingenieurs of Holland, who appoint only one honorary member a year, made Dr. van der Bijl their ninety-first member. This honour was actually conferred on the 91st anniversary of the Institute, which was also H.J.’s fiftieth birthday. Among his papers, carefully treasured, is a letter of congratulation from the late Professor J. T. Morrison, Professor of Physics at Stellenbosch, who gave H.J. his first lectures in mechanics. This was the last letter Professor

Morrison ever wrote and it was posted by Mrs. Morrison after her husband's death. A short extract will give some idea of the esteem a fellow scientist felt for a former student. The letter is dated "Stellenbosch, 13th October, 1944 ":

"A few weeks ago I happened to notice in 'Nature' that the Royal Society of London had done itself the honour of electing you to its Fellowship. Since then a rather long bout of poor health has interfered with my correspondence, but will you now accept my belated but very warm congratulations? It is a brilliant train you have joined - Hooke, Boyle, Newton, Faraday and Clark Maxwell, Joule, Kelvin, Rutherford and Bohr, not to mention my dear friend Sir David Gill. ... I meant what I said when I remarked that the Royal Society had honoured itself in electing you. Your own work is in true succession to the fundamental ideas of the Royal Society founders, not mere research but the bearing

on and application of the results of research to the welfare and highest interests of humanity and of one's country in particular. That side of the Society's work has often been unduly overlooked, but in that respect recent years have shown a wide improvement both of outlook and of practice. Your discovery of the true action of the de Forest Valve; then that brilliant application to long distance telegraphy and telephony-modern wireless, and Iscor, Escom and now Director-Generalship of Supplies, and Vereeniging, all with humane treatment of employees in the first place-all that is in the great tradition, and I can claim the privilege of being your old professor and so of being allowed to say so to you frankly."

CHAPTER 8

WAR

*“The time has come, the Walrus said, to
talk of many things
Of shoes, and ships, and sealing wax; of
cabbages and kings.”*

IN September, 1939, the god of war, after threatening us for many long, anxious months, finally took charge of the world and for six long, weary years became undisputed ruler of our destinies, governing our thoughts and actions, and taking into his grim keeping our very hearts and hopes until life became one long series of days of tension.

Little South Africa, far removed from the scene of battle, immediately decided to join the fray. Her decision to fight revived all the old arguments and the fires of racial hatred were once more fanned into flame. Many were just sincerely opposed to war and, being members of a free nation, could voice their opinions without let or hindrance. Others,

strangely enough, were wholly in sympathy with the Nazi cause and were prepared to commit acts of treason in support of its ruthless creed. This aspect is difficult to understand because large numbers of South Africans are direct descendants of Hollanders and a still greater number are of mixed blood—mostly Dutch, English and French, a rich, proud heritage, for all are fine, freedom loving people. It would have seemed more logical to suppose that the German invasion and ruthless bombing of neutral Holland would have made every true South African hate the German regime which countenanced such unprovoked aggression, quite apart from the fact that the Nazi ideology denied the fundamental principle of living which generations of South Africans had valued above life itself - personal freedom. Again the Nazi rejection of Christianity and the unforgivable invasion of the privacy, loyalty and unity of the home, with children called upon to testify against their parents, is in such complete conflict with the ideals of a freedom-loving

independent nation, that it would have seemed that every South African must of necessity, reject and condemn such a system, yet there were many so-called South Africans who were content not only to voice their allegiance to this foreign, unsympathetic nation, but to go further and try to assist the Nazis and their dreadful creed, by committing acts of violence and sabotage which, in some instances, resulted in the death of their own innocent fellow countrymen. This is an aspect which is still puzzling many South Africans today.

Fortunately in those dark days of 1939 the South Africans who really saw the danger ahead carried the day and South Africa, without hesitation, lined up for the fight and with no conscription of any kind, her sons flocked to the colours regardless of whether their home language was English or Afrikaans. They knew a threat when they saw one and were not prepared to sacrifice their heritage of freedom and independence - their forefathers

had paid too dearly in blood and suffering for the right to live as they chose.

It has been said that when Hitler heard that South Africa had declared war on Germany, he thought it a tremendous joke, and the declaration caused much mirth in the German capital. No wonder, for our total armed strength at that date consisted of: 2 high-speed bombers; 26 obsolete general-purpose planes; 40 heavy planes; 2 armoured trains; a couple of "bush carts." Certainly such "formidable" military might was good cause for mirth in Germany, but it was no laughing matter for South Africa. Fortunately, however, the country had some unlisted assets which enabled her to contribute a war effort which was certainly more cause for pride than for mirth. Among these were her great leaders, her almost unrealised adaptability and an intense willingness to serve.

In November, 1939, General Smuts asked Dr. van der Bijl to take on the job of Director-General of War Supplies. At the same time he was also asked to join the Cabinet but

declined, as always, to enter the political arena. "At present," he said, "I have no enemies that I know of, but if I join the Cabinet I shall immediately have 40 per cent of the population against me and I shall have to waste my time making conciliatory and tactful speeches." So the position of Director-General of War Supplies carried Cabinet rank without involving H.J. in party politics. It was a colossal task undertaken with no thought or acceptance of remuneration and taxed to the full his power of concentration, his ability to get things done, his organizing genius and his incurable optimism. The range of jobs alone was enough to daunt the staunchest heart - "shoes and ships and sealing wax" were only the beginning, but once again H.J.'s ability to choose his men and to gain their wholehearted, almost slavish support and to gain their willing and often unpaid service, made the impossible possible. His instructions that "the difficult jobs must be carried out right away, but the impossible ones could take a little longer" soon became the motto of the War Supplies organization.



PARADE AT SONDERWATER.

Col. van der Bijl on the left of the microphone.

It must be remembered that when H.J. took office there was no organization in existence ready to undertake the job. He had literally to start from scratch. The first plan was to consider which of the many items of army equipment could be made in South Africa - the balance it was planned would be imported. It all looked quite simple and straightforward in the days of the “phoney-war” before the fall of France.

H.J.’s own words give a clear picture of events when it became evident that the Union could hope to receive only the minimum of help from England and America:

“When the task of equipping South Africa for war was placed on me in November, 1939, the problem did not appear to be particularly difficult. We were going to manufacture as our contribution to the war effort such commodities as we were equipped for and to import the rest.

“It did not work out that way. When disaster overtook France in 1940, and we saw before our eyes the Black Hole of France with Dunkirk as

the solitary escape, we suddenly realized that the British Commonwealth stood alone and unprepared against the overwhelming might of Germany. Britain had to defend herself. She could spare us practically nothing and we looked in vain to America for war materials because of the extraordinary demands already being made on her by Britain. South Africa was literally thrown on her own resources. Innumerable articles on the equipment tables that we had marked for import, now had to be manufactured in South Africa. Our problems were almost staggering. But the spirit that had won the Battle of Britain was the spirit that manifested itself here also. Instead of succumbing to despondency our young men, realizing that their freedom was really at stake, rushed to the colours at a rate that became quite alarming to those who had to provide the uniforms, the boots and all the equipment necessary to enable them to put up a fight. In a few months machines in hundreds of factories throughout the Union started humming with an increasing crescendo and when our Commander-in-Chief,

General Smuts, gave the order to attack Abyssinia in April, 1941, the Springboks were ready and fully equipped - an army that any country could be proud of.”

The transformation of South Africa’s industrial structure was truly amazing for it must be remembered that there was no engineering background to that structure. True, the establishment of the Iscor Steelworks had encouraged the development of the engineering industry and there were a host of secondary industries growing up. There were the repair shops of the South African Railways and the engineering shops which surrounded the gold mines of the Witwatersrand, and, fortunately for South Africa, there existed a highly-developed explosives industry. On the debit side, however, was the almost crippling lack of skilled man-power, a lack even of semi-skilled factory operatives. The supply of man-power was indeed pitifully small. The machine tools available were the tools of repair shops rather than those of manufacturing shops. There were

no gunsmiths, whose grandfathers and great-grandfathers had been craftsmen in the gun-making tradition. There was no highly-developed or even co-ordinated textile or boot industry. It was like asking a half-grown child to make itself a complete party frock on a doll’s sewing machine.

The fact that the war effort was so successful probably surprised even the men responsible for it. A visiting American journalist during the war asked H.J. “What are you proudest of?” and without hesitation H.J. replied: “Of the ingenuity of our men in tackling jobs they never dreamed of doing before.”

The running of War Supplies was certainly a clever piece of organization - yet basically simple, straightforward and sound, as are all H.J.’s schemes. When the number and variety of products War Supplies were being asked to produce from thin air, grew ever larger and larger, H.J. realized that the range of talent, knowledge and experience required was so vast that ordinary methods of committees and

boards of directors would be useless as it would be impossible to gather together at one time a group of men having anything like the knowledge required. To meet the difficulty, H.J. built up what he called a "Panel of Consultants to the Director-General of War Supplies," the idea being that it would not be necessary to call all the members together at any one time but to consult them individually or collectively in any numbers, as might be necessary. This panel comprised about one hundred and thirty of the country's leading experts in a large number of specialized fields. The number was fluid and each member was called upon to advise on matters of which he had specialized knowledge. The plan worked exceptionally well, and H.J. has always maintained that there are no words to express his thanks and gratitude to the men who gave him so generously their time, experience and loyal service during those years of crisis.

Another feature of the War Supplies Organization was that organized labour too, gave of its

unstinting service. H.J., in his usual direct manner, invited the leaders of the four main Trade Unions to join his organization. They were given offices in Escom House and were called in on all big council meetings. They rendered most valuable service and faithfully honoured their promise that there would be no strikes or labour trouble in the Union while the war lasted.

Without the Iscor steelworks, South Africa's war effort would have been pitifully small and Hitler could have continued to smile, but although the steelworks were only five years old on the outbreak of war, they managed to carry the base load of the engineering output needed for war equipment. Almost overnight the steelworks turned to the production of armour plate, gun-steel, tool-steel and the like. Over 200 new types of special steels were added to the output of essential bars and blooms and sheets of peacetime demand. Iscor's contribution cannot be over-estimated, nor the

range of jobs tackled successfully at the Pretoria works.

In an almost unbelievably short time every workshop in South Africa was humming with war production. Plant which had originally punched out steel poles now set shell billets running through the draw bench; kaffir pots and coal stoves gave way to hand grenades and practice bombs; fuses for shells and bombs flowed on the production lines where steel windows had been made; from shops where winches for the mines were produced flowed a steady stream of field mortars. The foundries were matching this output with a stream of bombs for mortars and aircraft. Even machine tools and practice bombs poured out of a match factory.

The march of feet in South African-made boots grew and grew and the drilling squads were clothed in khaki, bush-shirts and shorts; the flow of food and textiles from various factories became a rising flood. Sixty-five types of specially designed army vehicles were being

built on imported chassis parts - armoured cars, petrol tankers, ambulances, troop carriers, water purifying plants on wheels, boring machines and bridging trains. Over 30,000 of these vehicles alone were on the Italian Somaliland border before the advance signal was given in January, 1941, for the invasion that led into Abyssinia. More than 10,000 tons of high explosive bombs were turned out and delivered to the aircraft of the Eighth Army before 1941.

H.J. still glows with pride when he thinks of those fully-equipped Springboks swinging into Italian Somaliland to make short work of the Abyssinian campaign. Remember, only a few short months earlier he had watched with a heavy heart those same Springboks, drilling cheerfully in civilian clothes, enthusiastically brandishing their broomsticks and walking sticks. The spirit was proud and fine and H.J. knew full well the value of that Springbok fighting spirit, for these were the descendants of two of the sturdiest races the world had so far produced, but he also knew that in modern

warfare it is the fighting equipment that counts. "The best general in modern warfare," he said "is an abundant supply of modern fighting equipment." To supply these boys with general fighting equipment worthy of them became his obsession, and gradually he was rewarded as the broomsticks gave place to rifles, the civvies to full battle dress and, as he took the salute of a fully-equipped army, his eyes were misty with unashamed tears of pride.

Many leading military men were of the opinion that had South Africa not been ready for the march into Abyssinia at that critical time (April, 1941), the great German pincer movement through North Africa on the one hand and through the Caucasus on the other might well have been successful - with disastrous results, for it must be remembered that America did not enter the war until the end of 1941.

The problem was not merely one of simply equipping troops and transporting them to the battlefield. At the terminus of its trans-continental journey the Springboks were called

upon to engage an enemy in a country whose frontiers were waterless miles of sand, lava dust and thorn bushes. Water trailers and ambulances, mobile workshops, artillery porters and staff cars, field laboratories and salvage units were only part of the wheeled equipment needed for the campaign. With no established automobile industry, the Union had to rely upon the United States and Canada for its engines and chassis. Every ounce of machine power was concentrated on the job. From coast to coast the forges, presses and lathes of the country bent to the task of supplying the thousand and one bits and pieces needed for this motorized army. The men and women in the transportation and engineering industries sent more than 40,000 vehicles rolling off the production lines into action.

Every contingency had to be prepared for. When it was feared that Italy's entry into the war would endanger the supply routes, almost the entire road-making equipment of the Union was collected and sent "up North" to build a

road from Kenya to the Nile, from where flat-bottomed barges could take over to carry the equipment down the river.

In that fateful April of 1941, War Supplies were ready and waiting, but a hitch somewhere along the route delayed the plans by a couple of weeks and suddenly rain became an ally of the enemy, and dry river beds became raging torrents. An urgent message was sent to the D.G.W.S. to send a supply of pontoons. Activity in the War Supplies Organization all but reached fever heat, but the pontoons were on their way ten days after the receipt of the message.

Behind the production of almost every item of equipment lies a fascinating story of ingenuity and improvisation.

Take rifle bullets for instance. When war broke out South Africa had an assembly for making rifle bullets at the Government Mint in Pretoria, but the output was naturally very limited and quite useless for war-time demands. At that

critical time neither Britain nor America could spare such a vital assembly and no drawings of the existing machines were available. So every Saturday night a group of engineers would descend on the lone bullet-making assembly and carry off some vital part which would then be measured, photographed and drawings and designs prepared. The part would then be taken back and re-installed so the plant could be in operation again by Monday morning. This went on until the whole plant had been dissected and designs for a complete assembly unit obtained. From these drawings and designs engineering experts built numbers of these cartridge-making assemblies, and before hostilities ceased over eight hundred million small arms cartridges had been supplied to the South African and Allied forces, all produced on these improvised machines.

The story behind the production of the first 3.7 howitzers is almost unbelievable. Unhappily there was no gun-making tradition in South Africa. There were no grandfather gunsmiths

who could pass on their craft to their sons and grandsons. There was just one partly-made field howitzer, a pre-war experiment, standing lonely and unloved in a country which had just learned that with the fall of France, if the Allies and South Africa herself were to survive, stupendous efforts would have to be made not only to arm her own sons, but to contribute as much as possible to the general war effort. The South African General Staff called urgently for howitzers - all right, War Supplies would see they were made. A Central Ordnance Factory was started and given its first job - these 3.7 howitzers. The steelmen started on their task of making the gun steel for barrels and breeches. Stewarts and Lloyds at Vereeniging turned their pipe-making plant into action and production engineers scoured the country for machines and men to operate them. Machines and machine-tools were borrowed or bought or made, and even the amateur backyard hobbyists contributed their tools and skill. Mine workshops, repair depots of the Railways and private engineering works - all contributed

their share. Machines were moved into a barn of a building and men and machines worked round the clock. Shops all over the Union were allotted their quota and the Central Ordnance Factory did the final machining and assembly. From inquiries made in America it had been found that the shortest possible delivery date would be at least 22 months, but in South Africa it took only seven months for the first howitzer to pass the proofing test and two months later - that is, only nine months after Dr. van der Bijl gave the order to produce howitzers - he personally handed over the first complete battery of howitzers to the military staff at Potchefstroom.

Then, feeling by now quite an old hand at this gun-making game, South Africa turned her attention to the six-pounder anti-tank gun, even before the last of the howitzers was off the assembly line.

Another triumph in ingenuity and determination was the production of practice bombs. The design of the practice bombs required by the

army was very complicated and the director of a match factory, asked to undertake their manufacture, feared that he would not be able to make them. However, he set to work and re-designed the bomb on simpler but just as effective lines. Eventually he was turning out over 100,000 bombs a month at a cost, filled and ready for operations, of a little over half the price of making the unfilled bombs in Britain.

Before the war South African boot and shoe manufacturers produced about eight million pairs of boots and shoes a year. This was almost useless for war-time requirements. "A soldier who is footsore is a soldier out of commission," said Dr. van der Bijl, and the supply of army boots and shoes was one of the first jobs he tackled. Between laughter and despair he bullied, threatened and pleaded until the whole South African boot industry swung into co-ordinated action and turned out a job that surprised us all. Every possible machine was pressed into service and all along the route of the raw materials required, hides, tanning

agents, screws, nails, wire-eyelets, toeplates, heel tips and the like, orders sprang overnight from hundreds to millions. No needle-making machinery existed in the Union and the inevitable bottle-neck threatened. A relay of aircraft on the American-African route brought the urgent packets and the song of the machines carried on in full chorus. When machine components broke or wore out and could not be imported in time, local workshops improvised tools and made them, even scouring the scrap heaps for usable bits and pieces. The Union actually supplied over twelve and a half million pairs of army boots - boots which earned the praise of even the most critical old soldier. In addition the South African civilian population, men, women and children, were also provided with an adequate supply of boots and shoes, in spite of the fact that the usual large importation of pre-war days had ceased altogether.

Around almost every item of equipment produced by the War Supplies Organization lies a similar tale of ingenuity and a will to succeed.

Gradually as things eased and Great Britain got into her stride, more specialized machines arrived to help South Africa's production and things became a little less harassing.

By the middle of 1942 grave shortages of civilian supplies began to build up and the supply position became chaotic. The difficulty was shipping and transport, and it was imperative to work out some system whereby really essential material could be given precedence and as little strain as possible placed on the gallant British Merchant Marine. Once again General Smuts approached Dr. van der Bijl and asked him to take under his wing the complete control of all civilian supplies. So the Director-General of War Supplies became the Director-General of Supplies and the administrative organization under his control grew to a total strength of nearly three thousand persons and the number of employees in D.G.S. factories approached a hundred thousand.

H.J. appealed for help and received an immediate and whole-hearted response. This

time his Panel of Consultants was composed of the leading representatives of the Chambers of Commerce, the importers and dealers in civilian requirements, and a central organization was formed to control importations by a system of priorities and permits.

"In the case of Civilian Supplies," he told the members of this new organization, "we are dealing with the requirements of the public and the public as well as its requirements are very varied, which makes the problem very difficult, especially as the public as a whole cannot be expected to know what is really essential." He then outlined the procedure he wanted them to follow and appealed to them to forget their individual personal interests and to solve all problems purely from the national point of view. Their trust was to put the national interests first as had been done by the war supply executives.

One of the most serious problems faced by the Supplies Organization, was to keep the gold mines in production. Supplies of machine parts,

lubricating oils and the like had to be imported from America, and the Americans could not see that gold was necessary for the war effort. It was, however, explained that the production of gold was of vital consequence to the whole South African economic set-up, and it was agreed that necessary equipment and supplies would be considered. In order to make sure that only absolutely necessary material was ordered, President Roosevelt suggested to General Smuts the formation of a joint Supply Council, which would be responsible for all orders sent to the United States. This Joint Supply Council consisted of three members, the British High Commissioner in South Africa, the American Minister Plenipotentiary and Dr. van der Bijl, and President Roosevelt himself suggested that H.J. should be Chairman of the Council, and undertook to see that any recommendation made by this Council would receive A1 priority in the United States.

Later in the war, during a visit to the front, Dr. van der Bijl and his companions noticed the

accumulation of tanks and equipment knocked out of service because of the lack of some vital part. Great Britain was doing a magnificent job keeping a steady flow of equipment coming through, but here was a job South Africa might be able to do and so lighten a little the load Britain was carrying. Back in the Union, H.J. and his men got to work and before long South Africa had earned the title of the “Repair Shop of the Middle East”. To earn this title it was necessary to organize a highly specialized set-up and to keep a steady stream of spare parts flowing to the front. The production of these spare parts called for a precision not before attempted in South African engineering. It called for special steels, for special jigs and gauges, for concentration of effort not quite equalled in other spheres of production. Often a set-up as elaborate as for a big mass production job was required to produce only a few hundred parts. It would have been almost as easy to make 10,000 as the few score needed. Many of the machines used had histories attached to them as exciting and as

adventurous as any war hero. One gear-cutting machine was smuggled out of Switzerland almost under the noses of the Germans and Italians. Others were made of a conglomeration of odd parts gathered from scrap heaps. In addition to the many special small jobs, over one and a half million spare parts were manufactured for motor vehicles, tanks and aircraft, and flown direct to the mobile workshops, so that many an abandoned lorry, tank or aeroplane lived again to harass the enemy.

The South African Tank Corps held a special place in Dr. van der Bijl's heart. As their Honorary Colonel he was intensely proud of the fine record put up by these boys, and just as proud of their fellows who built their iron steeds for them. As can be imagined, the production of armoured cars in a country which had no automobile industry was no easy matter, but the Tank Production Corps worked twenty four hours a day turning out over fifty vehicles a week.

The list of jobs undertaken by the Supplies Organization, under the direction of Dr. van der Bijl, is almost endless. How he fumed when he got entangled in the red tape and sealing wax which seems so necessary a part of all Government and Military undertakings. Fortunately he had been granted almost unlimited powers and was able to slash at the choking restrictions and "get things done." At one stage there was a delay in obtaining authorization for the ordering of about two and a half million pounds' worth of chassis parts required for the Abyssinian campaign. The matter was desperately urgent and delay would have meant the sacrifice of precious lives, so H.J. acted without authorization and sent through the order. He was told that he would probably be surcharged for his action, but replied that he didn't have two and a half million pounds anyway, and if he were sent to gaol he would at least get a good night's sleep for a change. Needless to say, the authorization eventually arrived and the transaction received official blessing.

It was in October, 1940, that, during a tour of the munitions factories with the Governor-General, H.J. explained his outlook on the ever-mounting war expenditure.

“From a purely material point of view,” he said, “war expenditure must necessarily be wasteful, but it is incurred for the maintenance of our principles and free institutions, for which our forefathers made even greater sacrifices. As against this must be offset two matters of great national importance. The first is that never before has the industrialization of South Africa which has taken place during the past decade or two evinced its national value to nearly the same degree as at present. It is with a sense of satisfaction and relief that we realize that, as a result of this industrialization, only a small portion of the vast defence expenditure represents loss of exchange or national impoverishment. The bulk of the money spent circulates within our own borders.

“The second is the insight obtained into our great industrial potential - a potential which, if

suitably guided, can be used as a powerful driving force in the period of economic reconstruction which must follow the war. No investigation of our industries, no national industrial survey by commissions or individuals, no conferences of experts could reveal what has been revealed by this great common collective effort, namely, the cleverness of our engineering designers, the resourcefulness and high standard of proficiency of South African engineers, the adaptability of our artisans and mechanics and the high standard of their workmanship, in which any nation can take pride.”

He continued: “It was only because they had to do it that it was found that they could do it.

“This revelation shows that, given proper organization, South Africa can, with its own brains and materials, embark upon a new era of industrial development that will have a profound effect in increasing the affluence of our people and raising the standard of living of the poorer sections of the community.”

We have talked, as the Walrus predicted, of many things - the shoes and the sealing wax have received their share, but what of the ships? As a youngster, H.J. had always loved ships - what normal boy can resist the lure of the sea and the enchantment of ships. The sight of a graceful vessel nosing her way into port always made him dream again his old dream of the day when South Africa would own her own shipping lines and when lovely vessels would come into port flying the Union flag. His determination to make this dream come true was strengthened even as early as 1911, when, as a boy on his second trip to Europe, the treatment of the passengers on certain shipping lines plying between South Africa and England had made him resolve that his dream ships of the future would be quite, quite different. Only a few years after peace was declared, H.J. actually made this dream come true and experienced the joy of steaming into port on one of his own ships – “The Constantia,” a 15,000-tonner on her maiden voyage from the United States of America - the first ship of

what he hopes will one day become South Africa’s future merchant marine. That, however, is another story. During the years of the war it was not graceful ships which steamed proudly into South African ports, but grey-streaked skeletons which slipped in under cover of darkness - battered and torn, with their crews as badly in need of aid as the ships they sailed. The people of South Africa took care of the men and no effort was spared to provide for their comfort. They were speedily refitted with warm clothing, given food and entertainment - anything to make them forget the horrors they had experienced. Some of these men had been torpedoed many times over and the people of South Africa wanted to show how much they appreciated their courage in keeping open the vital sea routes and bringing through to us equipment and supplies so desperately needed.

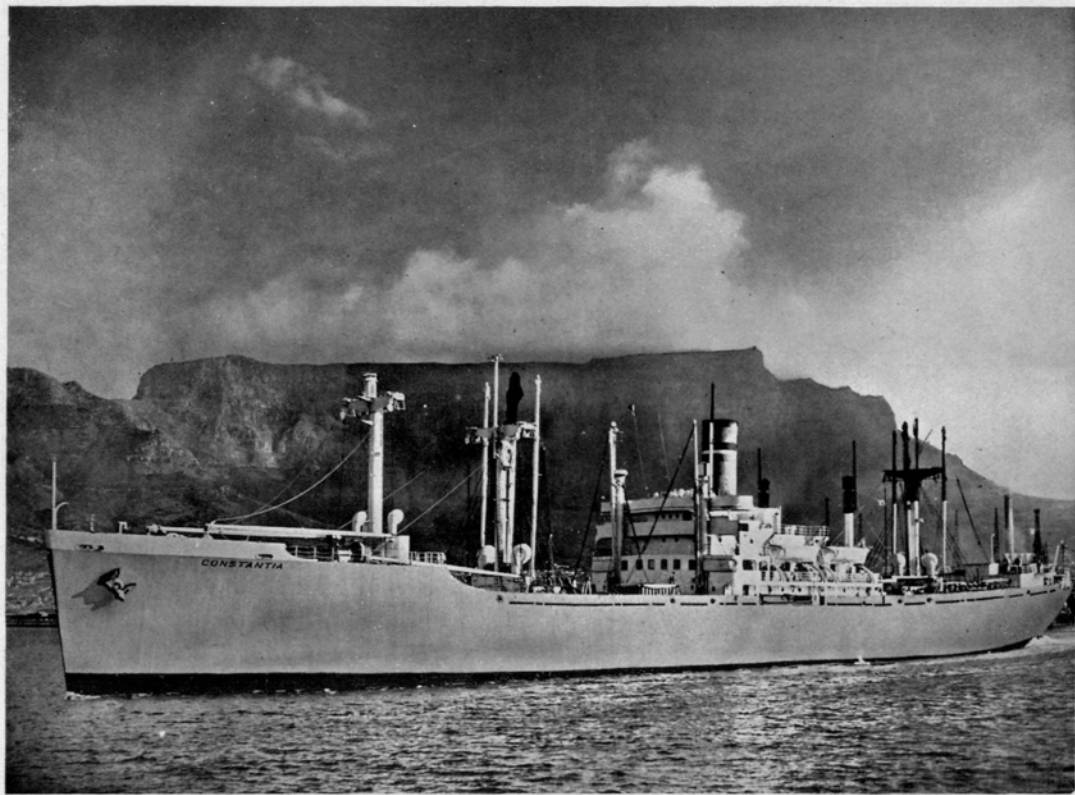


TABLE MOUNTAIN PROVIDES A FITTING BACKGROUND FOR THE "CONSTANTIA"

The repair of the ships themselves was a colossal task. Here again there was no centuries-old ship-building industry, no men who had been born and brought up in the atmosphere of ships and ship building. Yet with her pitifully small resources, the job was tackled and soon South Africa was repairing and refitting as many as 300 ships a month and carrying out almost miraculous feats of improvisation and repair.

The initial burden of these ship repairs was of course borne by Iscor, and her engineers found themselves turning out plates which before the war they would have dismissed as completely impossible.

It was all this activity caused by the shipping repairs which encouraged Dr. van der Bijl to try to turn this war-time necessity into a benefit of peace and to attempt to use this particular section of the war effort as a nucleus of a permanent South African ship building industry. However, that particular incident

belongs with the story of the shipping industry, which comes later.

At the beginning of the war the shortage of blankets became critical and appeals were made to South Africa to do all she could. Before blanket production could get into its stride it was decided to commandeer all the blankets of the South African Railways and Harbours. Civilian travellers could freeze for a while and the blankets were sent off on military service “up north,” and many a Springbok must have had nostalgic memories of trips to the coast as he curled up in his blankets neatly marked “ S.A.R. & H.”

This, however, was only a temporary measure, and before long South Africa was producing 100,000 blankets a month, all made almost entirely from South African merino and karakul wool, and before the war ended, in addition to supplying her own army, three million blankets had been exported to her Allies.



A QUIET JOKE ABOARD THE "CONSTANTIA".

Dr. and Mrs. van der Bijl, 1947.

Photo by "The Natal Mercury."

The shortage of skilled artisans was one of the gravest difficulties facing the country. This was solved by an idea originated by Iscor's Chief Engineer, who suggested the now well-known C.O.T.T. scheme (Central Organization for Technical Training). A group of officials, employers and trade union representatives formed a Central Management Board under which the scheme functioned, and with the co-operation of several large Technical Training Colleges intensive courses were mapped out covering a range of subjects. The scheme was so successful that boys who had never handled a tool before could, after a training of from three to six months, take their places in the production shops and turn out work worthy of a skilled tradesman. About 30,000 men and women took advantage of this training scheme, and at the conclusion of hostilities the organization was handed over to the Education Department for the purpose of training ex-volunteers.

Even in the field of radio (H.J.'s early love) South Africa added her "widow's mite".

Nothing spectacular could be achieved, for never before had anything in this line been attempted in South Africa. The skilled staff of war supplies radio production was formed by a nucleus of radio enthusiasts, the amateurs who had graduated from crystal sets and cat's whiskers to the elaborate sets of modern radio. Importing as little as possible and stretching ingenuity and skill to the utmost, this team turned out numbers of two-way communication sets for armoured scouting cars, walkie-talkie sets for the infantry, land-mine detectors and a host of other valuable contributions to the maintenance of rapid and efficient radio communication. A delicate little instrument for detecting time fuses in unexploded bombs was developed and numbers were produced and sent off to play their small but important part. Many and varied were the "impossible" jobs successfully carried to completion by yet another branch of the vast War Supplies Organization.

Quite apart from all the equipment, clothes, blankets, etc., needed by the army, its men had

also to be fed and kept in good health. The medical laboratories took up their share of this burden, testing out food for vitamin content, providing blood-serum, snake-bite antivenin (this latter for the forces fighting in tropical Africa and the jungles of Burma), anti-gas gangrene serum and, of course, anti-typhus vaccine. Literally millions of anti-typhus vaccine ampoules were made, sealed and despatched on their long journey to the Russian forces. One order alone was for five million anti-typhus vaccines. No wonder the South African housewives wondered where all the eggs had gone.

Just before the outbreak of war, H.J., while on a visit to London, received a personal invitation from Hitler to pay a visit to Germany as the guest of the Fuehrer. The German Ambassador, who delivered the invitation, informed H.J. that Hitler, knowing of his enjoyment of a game of golf, had arranged for him to try out several of the newly-completed German golf courses. The visit suggested was for two weeks with an

inspection of the German industries as one of the attractions, culminating with a visit to the much-publicized Nuremburg Rally. Fortunately H.J. declined the invitation, for had he accepted, he would have been in Germany when war was declared and South Africa would have had to find another D.G.S., for it is unlikely that Hitler would have allowed so valuable a prey to escape from his grasp.

South Africa can well be proud of her war effort and doubly proud of the man who was the mainspring and inspiration of that effort. Proud, too, of the fact that the problem was not to persuade her sons to join the armed ranks, but to keep sufficient of them at home so that the wheels of industry should not stop. Really stern measures had to be adopted to prevent skilled men from joining the fighting forces. They all wanted to have a crack at this fellow Hitler, and there was certainly no romance in standing at a bench working all hours, or poring over documents and plans trying to make an inadequate machine do a job for which it had

never been designed and trying to train overnight unskilled though willing workers. They did a powerful job and did it well with no honour and glory attached.

To make the lot of the “soldiers on the home front” a little less onerous, H.J. decided to enrol all the key-men as part of the army. They signed the same oath as the volunteer soldier and handed over to their country their skill and brains to be used in any manner necessary. They wore no uniform but were issued with small “key-man” badges and had no military privileges. It was certainly no fun being a “key-man,” but they pulled their weight and played a vital role in South Africa’s contribution to the Allied war effort.

The women of South Africa, too, were not behind in their efforts to serve. More than 10,000 women came forward to serve in the engineering industry alone. These women were housewives, clerks, typists, shop assistants, farmers’ daughters. None had had workshop experience, but they were keen, willing and

adaptable and, like their sisters overseas, carried out any task asked of them. They worked long hours and then went home to start again on their domestic chores. Admittedly, conditions were not nearly as grim as for the women of England, but it must be remembered that South African women are used to an easy life. South Africa is rightly called a “woman’s paradise,” for in spite of the oft and loudly lamented drawbacks of our Native servants, very few South African women ever have to face the continuous back-breaking work of house-cleaning and laundering.

At the beginning of this chapter the figures for our pre-war military equipment were given a modest little list indeed. The following are the figures for just some of the more important equipment produced by War Supplies during the war:

20,000,000	Bombs (up to 1,000 lbs.), shells, land-mines, etc.
1,400,000	Tank and aircraft spares
800,000,000	Small arms cartridges
2,000,000	Steel helmets

32,000	Motor vehicles of 80 different types
6,000	Armoured cars
674	Howitzer and anti-tank guns
18,000	Gun and mortar sights
900	Bellman hangars
11,000	Trench mortars
640	Land-mine detectors
680	Wireless transmitting and receiving sets
12,500,000	Pairs of army boots
34,000,000	Blankets, shirts, uniforms, greatcoats, etc.
300,000	Tons of canned foods, condiments, etc.
1,000,000	Gallons of drinks, ranging from fruit juices to rum.

Plus a host of other army requirements, specialized jobs and the like. These figures may not seem very impressive when compared with British or American output, but it must not be forgotten that the entire white population of the whole of South

Africa is well under the average population of one medium-sized industrial city in America, nor must it be overlooked that a large percentage of that population was on active military service.

At a banquet given to Dr, van der Bijl in London a few years ago, the South African war effort and his own share in that effort, were praised very highly indeed. H.J., embarrassed by the very flattering remarks and knowing full well the mighty effort put forward, under frontline conditions, by the people of Great Britain, replied that he felt rather like the old Negress who, with her small son, was attending the funeral of her husband. The Negro minister conducting the burial was evidently in an eloquent mood and praised the departed man so highly that after listening a while the mother turned to the child and said: "Come on home, child, we've gotten to the wrong funeral."

Nevertheless, in his heart Dr. van der Bijl was deeply proud of the achievement of his small

country and still talks with gratitude and affection of the men who helped him to carry out this colossal task, men who worked long hours, more often than not accepting no remuneration and leaving their own businesses to fend for themselves, while they worked like galley slaves to make South Africa's war effort something worth while.

CHAPTER 9

ON FOUNDATIONS OF STEEL A MODERN CITY RISES

"The manufacture of steel must never fellow industrial development, it must lead that development."

-H.J. v. D. B., 1942.

AGAIN the crowded year of 1940-year of disaster and miracles. In truth "from adversity comes strength" for the people of England, with their backs to the wall after the fall of France and the miracle of Dunkirk, were making unbelievable efforts and little South Africa, united at last, marched solidly behind

her great leaders. It must have seemed to many that one of those leaders - our white-haired Director-General of Supplies - had surely discovered the secret of conquering the biggest enemy of all - time. Months of work were accomplished in days and yet the vision he had seen as a boy was still dominant. The war had taught him, by bitter experience, that never again must South Africa be so industrially unprepared. Inwardly cursing his lack of foresight in planning on too small a scale - although throughout his packed career he had been loudly and publicly criticized over and over again for his "too vast schemes," he would sometimes allow pleasant dreams of future post-war planning to lighten a little the load he was carrying. How much more pleasant it was for him to build for the future and forget the waste and destruction of war.

One winter's day in June, 1942, he decided to play truant from his desk at Escom House and with one of his close friends set off for the day. Together they tramped over the golden veld,

planning as they went. For years H.J. had known that Iscor must expand, and having reached the limit of the Pretoria site capacity, he was now busily seeking new ground. Twenty years earlier he had written: "The future of the industrial development of the Transvaal must, of necessity, lie along the banks of the Vaal River." He had long forgotten these prophetic words, but was seeking a site large enough to encompass not only the new Iscor steelworks - even larger than the parent works at Pretoria, but also with unlimited room for expansion and for the many more large industries he hoped the new steelworks would attract. Such industries bring with them heavy demands for water and for effluent disposal and so he was exploring along the banks of the Vaal, west of Vereeniging beyond the divide. Johannesburg itself 36 miles away, was dependent for its domestic water supply on the Vaal River, so the effluent of his dream industries must, of necessity, go west. Standing there in the clear air of a crisp winter's day he realized that here at last was

the right spot. Land in plenty - yes, but if he were to build industries he would need men, and men must have homes, shops, recreation facilities and the thousand and one necessities of modern life. Vereeniging, the nearest town, was 11 miles away and already crowded to capacity. Slowly the vision of a new industrial city, carefully planned, beautiful to behold, took possession of him. To start from scratch on virgin soil, with no old haphazard growth to impede the design, no established property rights barring the path - what a vision indeed. Such an opportunity could not be missed. Enthusiastically he returned to Johannesburg full of his brave new ideas and somehow managed to pack into his already crowded days the study of township planning, street layout and lighting, ideal homes and the like, until the drawers of his desk in his study at home, became filled with drawings, notes and plans for this grand new scheme.

Thoughts of the haphazard growth of Johannesburg from mining camp to city, the

ugly congestion of Cape Town in its surroundings of breath-taking beauty, and the tremendous difficulty of righting old mistakes, made him then and there resolve that this time the growth must be planned, planned as carefully as was humanly possible. Standing on the bare brown winter veld he had seen a vision of his dream city rise before him. Here would be a school, there a hospital, wooded parks, playing fields and health clinics, wide, clean roads, fine buildings and gracious homes - all these and more would form his dream city. What an opportunity! Surely, never before had it been possible to build a new town right from the start with all the modern benefits of science and engineering as a basis. The prospect was both exciting and frightening - how lucky he was to have been given such an opportunity.

It is easy enough to describe an ideal city as one without congestion, without slums and without poverty and, therefore, without crime. It is not so easy to design and lay out a city so as to ensure that throughout the ages of its long life

these undesirable features will not sooner or later encroach on the ideal. H.J. had once said in a bitter mood that a study of South African urban development showed clearly how parochialism, greed and lack of aesthetic sense had resulted in a conglomeration of concrete piles that were an insult to civilization. "Congestion and more congestion," he wrote, "is the keynote, with higher and higher land values, until our poverty-stricken people become quite helpless and dragged down willy-nilly, further and further into squalor and vice and then some of us are stupid enough to wonder where crime comes from."

This time, he resolved, the planning would be based purely on sociological lines and this city would be guided by legislation primarily intended for the benefit of the masses. The other experiment had been tried too long with disastrous results.

Many and varied were the problems, and his many other duties and the heavy burden he was carrying as Director-General of Supplies, left

him little enough time for the planning of this new and pleasant task. He did not underestimate the difficulties. The perfect town - like the perfect house - will never be built. Design and re-design as you will, the moment the building is finished improvements spring to mind. Shortly after the project had started, Dr. van der Bijl himself said:

“My experience thus far in building a town has made me only too conscious of the tremendous complexity of the problem and the need for a substantial element of modesty and, I might say, even humility, in approaching a task so colossal and formidable as that of dealing with the lives of nearly a quarter of a million of one’s fellow human beings.” A modern town with a quarter of a million population - that was his vast conception, the ultimate goal for which his plan must be made here and now.

Without delay he set to work to gather around him the men to carry out the task. Town-planners, architects and engineers set to work. H.J.’s own definition of an architect was “A

scientist and an engineer, with a good deal of artistic taste thrown in,” and he set out to find architects who really fitted this definition.

The first problem was, of course, to obtain sufficient land. There was no use having pockets of land held by speculators who could - and would - thwart all the plans and retard developments by holding on to isolated pieces of ground waiting for enormous profits with no effort involved. Initially Iscor had purchased ground for the new steelworks and work on the new plate mill was already under way, for it must not be forgotten that the war was still making vast demands on South African industry and the products of the plate mill were desperately needed. The plate mill came into production in 1943 and is one of the largest and most modern plants in the world.

Gradually, an area of over 37 square miles was purchased and plans for the town could go ahead. H.J. decided that here was his chance to expand the fundamental conception of Escom and formed a Public Utility

Company known as the Vanderbijl Park Estate Company, which was registered on 28th December, 1944. Like Escom, this Company is non-profit-making and its income and profits whencesoever derived, must be applied solely towards the improvement of the town and no portion thereof may be paid or transferred directly or indirectly, by way of dividend, bonus or otherwise to the members of the Company. All profits must be applied to the constant improvement of the town for the benefit of its citizens.

Such idealism is rare in these materialistic days, but Escom had proved to H.J. his belief that public utilities should be run for the benefit of the public and that the profit-making motive could be eliminated very successfully.

He did not want this new town to become an Iscor preserve, he wanted to encourage private enterprise and to attract capital and natural expansion and growth. Therefore Iscor selected those portions of the land it needed for

its own requirements and sold the balance to the Estate Company at cost. Thereafter the planning of the town became the duty of the Estate Company. Land was to be made available for sale to the public for industrial, residential, trading, business or any of the usual purposes that make a town and encouragement given to any person or body desirous of becoming established at Vanderbijl Park. The only restriction placed on land sales is the prohibition of speculation in undeveloped land. H.J. was determined that this time there would be no vacant plots standing for years, becoming rubbish dumps and breeding places for vermin, while the owner sat back waiting for his investment to appreciate. The unearned profit motive had to be eliminated if things were to progress systematically on planned lines. It is, therefore, a fundamental rule that any ground purchased from the Estate Company must be built upon within an agreed time, failing which it reverts to the Company at the original purchase price. However, once the principal



A DREAM BEGINS TO TAKE SHAPE — VANDERBIJL PARK, 1946.

building has been erected on the site, it may then change hands at any price and as often as desired.

Once again H.J. used his old, oft-tried and successful methods. He called together a young team of technicians and administrators, explained his ideas and ideals and told them to get on with the job.

Very soon this young group of workers were as enthusiastic as H.J. himself. With almost forty square miles of virgin veld on which to build their town, they set to work with high hopes. A group of men went off to Europe and America to study, look and learn. There was to be no congestion, of that H.J. was determined. They had five miles of river frontage, so they decided right from the start that this glorious stretch of water would not be enjoyed by a few lucky owners of property along the banks, but would be the property of the town, so an open park was planned along the whole length of river frontage. In addition to numerous other parks and playgrounds throughout the town,

the whole area is surrounded by a “greenbelt” measuring some 25 miles, and one of the very first jobs was the planting of over three-quarters of a million trees as a start.

An accurate five-foot contour plan of the entire land holding was prepared, and from this drainage, main roads, sewage disposal and the like could be planned. Modern town-planning was studied in detail, drawings and models were made, discussed, improved and re-designed. Maybe a perfect town could not humanly be built, but at least these builders were striving for perfection. There was to be no over-crowded slum areas around the industrial sites, no huge sprawling urban masses with workers living miles from their employment and crowds of Natives passing in thousands through the town and suburbs to get from their work to their far distant homes, involving, as it does, an enormous and unnecessary expenditure in time, money and human energy.

The ground on which Vanderbijl Park is built, rises steadily northward from the Vaal River to a point where it was decided to build the water reservoirs, from where it falls slowly to the northern boundaries. This was really ideal, because the sites for the new steel works and other industries could be reserved in this northern sector and would consequently be somewhat concealed from the southern sector where the bulk of the European residential areas are located.

To prevent the development of crowded areas around the industrial sites, the town was divided into industrial and residential areas. Each residential area - of which some twenty have already been planned - is designed as a self-contained unit with its own shops, schools, flats, playgrounds, recreation clubs, swimming baths, cinema, and so on. In addition, space has been provided for a large central area - known as the civic centre - where the municipal offices, law courts, banks, theatres, building societies, shops and the like are to be

concentrated. In this area provision has been made for art galleries, museums and even the establishment at some future date - such is H.J.'s faith in the future of his town - of a university.

Special care was devoted to the planning of this civic centre and the proposed layout was only decided upon after long and detailed study of civic centres throughout the world - the golden opportunity of being able to profit by the experience and mistakes of older cities was not to be neglected. This civic centre, the hub of the town, had to be as near perfection as possible. First of all, ample space was provided and an area of 350 acres in extent was reserved. Possible pedestrian routes were studied and mapped out before the sites of the municipal offices, library, central post office, magistrate's court and other large buildings were decided upon, and each of the proposed buildings are located in settings best calculated to show off to the best advantage their architectural beauty, and the liberal use of

parks and open spaces will make it possible to achieve dignity and spaciousness. The main road through the civic centre will be 180 ft. wide and cinema and theatre sites have been planned to avoid traffic and parking congestion. Dignity and spaciousness are to be the keynotes of Vanderbijl Park - already aptly known as the City of Ideas and Ideals.

Knowing that size alone is no virtue, these planners wanted no haphazard mushroom growth that would make future developments almost hopeless. They wanted to learn from the experience gained in other rapidly growing South African towns. Every step was planned and every possible future contingency provided for.

Water supply was, of course, a prime necessity. Fortunately, the works of the Rand Water Board were not far away. Right at the outset a fifteen-inch rising main capable of delivering three million gallons of water per day, was installed and two 100,000-gallon low-level and one 100,000-gallon high-level

reservoirs were built. Next, in collaboration with the Department of Public Health and the Rand Water Board, the problem of sewage disposal was tackled. Then in turn came storm water drainage, the provision of railway facilities and roads.

The best siting of the main railway station, the location of stations and halts to serve the non-European areas, the goods yards and the entire railway network was discussed in detail with the South African Railways and Harbours Administration and planned in detail for present and future requirements.

H.J. had seen too much of the waste, inconvenience and general annoyance caused by the usual and frequent overlapping of most municipal departments, so he resolved that here was one mistake that could and would be avoided. In almost every town in South Africa such overlapping can be seen daily. The roads department no sooner finish making a road when the water department, or the electricity department, or the sewage department - quite

often all three in turn - promptly start digging it up again in sections to lay their pipes and cables until eventually the road surface is absolutely ruined. At Vanderbijl Park no road is made or buildings commenced until all the water mains, sewage pipes and electric cables have been laid.

The electrical reticulation is by means of underground cables which, although initially more costly, will be more economical in the long run and has the added advantage that there will be no necessity in the future for the inevitable pruning and mutilation of trees as is the case where the supply of electricity is provided by means of overhead wires.

Very careful thought has been given to the layout of roads. From the contour plan it was evident how traffic would move from point to point, and which routes would have to carry the rapid and heaviest traffic. Road safety was a prime consideration and it was decided to plan a number of main boulevards to carry the fast-moving traffic - these are 120 feet wide

and consist of two carriage-ways, a centre island and two verges and sidewalks. Portion of the verges and sidewalks will form a cycle track to keep bicycles off the main road. Housing is planned mostly along the minor roads, and school sites are located so that the children of the neighbourhood will not have to cross the main thoroughfares to get to school. The centre islands of the boulevards are to be planted with, lawns and small trees and shrubs.

That thorny question - parking, which has become an almost insuperable problem in most large cities today - is being solved at the source. Off-street parking for vehicles loading and unloading merchandise from shops and warehouses has been provided in all areas and large open areas have been reserved for car parks. In the civic centre, particularly generous allowance has been made for parking areas adjacent to cinemas, theatres and hotels.

Industrial cities are seldom regarded as beautiful, but at Vanderbijl Park, H.J. has endeavoured to anticipate the cause of the

usual squalor and dirt of industry and to eliminate it at its source. Every precaution will be taken to obviate the smoke nuisance, and industries will be kept as spick and span as is humanly possible. An area to be known as the "Clean Industries Area" has been reserved for the laundries, bakeries, printing works, markets and so on, and the motor town section is adjacent to this area. In the civic centre the professional and office section is planned on the quiet side of the area and is convenient to the sites reserved for clubs, cafes and hotels.

Maximum freedom will be given to individuals in the building of the town centre - H.J. is too firm a believer in the value of individual effort and initiative to desire any form of regimentation - but to ensure dignity and character a certain measure of architectural control may be exercised by the Estate Company if the need should arise. To ensure the adequate access of light and sunshine in the civic centre, all buildings will be limited to a maximum of six storeys.

It is a well-known fact that in most South African towns the housing of the Native population has become a very grave problem and until it is solved satisfactorily we shall continue to have a high proportion of crime among our urban Natives. Usually "locations" are built many miles from the centre of the city involving heavy travelling expenses, fatigue and loss of efficiency to the Native workers. It is quite usual for house-maids or factory workers to have to travel from the outskirts of one suburb through the centre of town and out to the outskirts of another residential suburb, to reach their place of employment, with the same journey in reverse at the end of a day's work. Native buses and trams are packed to capacity and it is easy to realize the feeling of resentment and bitterness as a native travels from the well laid out comfortable home of his or her employer to the overcrowded squalor and filth of one of the numerous Native townships.

H.J. was determined that, in planning the non-European areas of Vanderbijl Park, such

conditions would not be permitted. His own words aptly express his feelings: "I do not believe," he said, "that by building the Native townships we see today, we have come anywhere near solving the Native housing question. Some of our Native townships are a disgrace, and an insult to our intelligence. If you study the Native way of living in his kraal you will appreciate that the Bantu has a civilization of his own that deserves consideration. By our standard of measurement we may not call it a civilization at all, but we must be careful. We must look at something more deep-seated than the use of an electric stove. Instead of providing the urban Native with the lowest standard of living of the European (thus creating black slums as fast as we demolish white ones) we should try to recreate the Bantu ideal and clothe it with the amenities of European civilization. Vanderbijl Park is being laid out for a population of two hundred and fifty thousand, a considerable portion of which will be Natives living with their families. In laying out the townships I

shall try to follow the principle of clothing their ideal with the amenities of European civilization and I shall not be too proud to consult them."

Provision has been made for and work commenced on three non-European residential areas in close proximity to the industrial areas, yet separated from the residential section by a "green-belt" area. In this way the Native employees will not have to pass through the European residential section to get to and from their work and the same care and thought has been given to planning these Native townships as has been given to the whole layout of the town.

As has been mentioned earlier, H.J., in one of his "spare" moments, designed a form of steel shuttering for building Native houses in concrete and erected a small experimental house near Village Main, Johannesburg, to test its efficiency. This house consists of two bedrooms, a living room, kitchen, scullery and bathroom, with indoor water-borne sewerage. It

was built of concrete with corrugated asbestos roofing and steel doors and frames. No timber whatever was used so there was no danger of vermin infestation. The construction principles were exceptionally simple and economical and needed a minimum of expert supervision. The basic design permits of many variations and can be successfully used for large scale building.

At present numbers of Native houses are being erected on this principle at Vanderbijl Park - they are grouped in circles reminiscent of the family kraal, and each dwelling will be supplied with a coal stove, water-borne sewerage, water and electric light and the Natives will be encouraged to make gardens around their homes. On present figures of cost of building and materials, it is estimated that these houses can be let at about £2 per month. What this will mean to the average Native worker who in our large cities today is expected to pay almost as much as this for one room in which his whole family must live, eat and sleep, can well be imagined.

The same principles as have been applied to the layout of the European neighbourhood units have been applied to the Native townships. Here, too, is the generous provision for parks, open spaces, schools, clinics and hospitals. On the outskirts of each Native township there will be large recreation grounds and in the centre of each area provision has been made for Native hostels, hotels and eating houses.

H.J. believes that by planning on these lines right from the start he will ensure the supply of a healthy, contented and willing labour force for the industries, gardens and homes of his town.

His instructions to his planners to provide for all and every contingency, are certainly being carried out. "You must plan from the cradle to the grave," he told them, and then added "you can even start a bit before the cradle and provide good ante-natal clinics."

The maintenance of health, rather than the cure of the sick, is the duty of the health authorities at Vanderbijl Park. H.J. believes that human

beings, like machines, need periodic overhaul and check-up to keep them running smoothly, but this can only be attained if adequate medical attention is available to all. To provide for these services the "Vanderbijl Park Medical Benefit Society" has been formed and any person resident at the Park is entitled to membership, irrespective of whether he or she is employed by the Van der Bijl Group or not. One of the many clinics planned for the future, is already in operation and a three-storey hospital is nearing completion. This hospital is the first part of a hospitalisation scheme which will eventually comprise a general hospital, maternity home, isolation hospital and main clinic for periodic examinations. Here once again the designers have used to the full, modern knowledge and experience in designing operating theatres, wards and the like.

Even the dead have not been forgotten and the cemeteries will be parks in the greenbelt area surrounding the town, and sites for the funeral parlours have been reserved at the entrance to

the cemeteries thus avoiding traffic congestion through built-up areas.

Many critics maintain that this detailed organization and provision for all foreseeable contingencies is a bad thing, and they gloomily prophesy that the future inhabitants of Vanderbijl Park will be a weak-kneed lot and will be sadly lacking in such virtues as self-reliance and independence. Time will, I am sure, be on the side of the planners, for ill-health is surely one of efficiency's chief enemies. What man can concentrate on his work if ill-health dogs his footsteps or his mind is occupied with the terrifying thought that he cannot afford to provide the necessary medical aid for one of his loved ones? It is more likely that the people helping to build this city of the future will be bright-eyed, healthy and happy, with keen, enthusiastic minds bent on planning and building. There will, of course, be the inevitable mis-fits and grouzers, but, judging by the present standards, most of the residents will be enthusiasts, intensely interested and excited by

the prospect of forming part of this grand experiment.

Much has been said of planning, but this is no blue-print project. Large-scale development has already taken place and over fifteen hundred homes have been completed and occupied. The recreation club and school are quite old-established land-marks, while shops, flats and office buildings seem to appear from thin air. To the occasional motorist driving along the main Vereeniging-Parys road, it would seem that the growth has been too fantastic to be real. Only three short years ago there was just a stretch of open veld with here and there one or two of the typical mud huts built by some transitory Native family. Now an ever-expanding little town goes busily about its business.

Once the driver turns his car into the town area, it is immediately evident that H.J. must have frequently shared the common annoyance of peering unsuccessfully at street corners in the vain hope of finding a name-plate. Here

every street and boulevard is liberally sign-posted, and a lasting tribute has been paid to the men and women of the world who have "achieved greatness," for all the streets are named after scientists, engineers, musicians and medical men.

The suburbs themselves are not named but carry merely the postal district designation. This is the practice followed in London and many large cities of the world and has the advantage of making the whereabouts of a township or suburb readily known.

Along the banks of the Vaal River, hundreds of thousands of trees have been planted and small stone fire-places provide for the week-end family picnic. The park along the river bank has been christened the "Emfuleni Park," and forest drives, some over eighteen miles in length, wind along the river among the fast growing trees. One area has been reserved for a bird sanctuary, and the numerous berry-producing trees have already attracted a wide variety of bird-life. With swimming, boating,

fishing, riding and driving on their very doorstep, the residents of Vanderbijl Park do not have far to seek for their outdoor pleasure. An eighteen-hole championship golf course is nearing completion and should soon be ready for play.

All this is surely putting the cart before the horse, for although Vanderbijl Park is literally and speedily becoming a city in a park, it is naturally dependent for its very existence on the industries originally responsible for its conception.

At the cross-roads two large sign-posts point the way to the industrial sites. S.A. Iron and Steel Industrial Corporation, Limited, reads one. That is an old friend, and the Plate Mill, which is to form the nucleus of the new Iscor steelworks, has been in operation some time and is rapidly providing heavy steel plate for boilers, heavy engineering, shipping, railway-wagons and so on. It is planned for three times its present productive capacity and H.J. must often wish for a magic wand which would

enable him to make his steel industry expand overnight to meet the ever-growing demands of the engineering industry. The new steelworks will be larger and more comprehensive than the parent plant at Pretoria, and no time is being wasted in getting this new source of wealth under way.

The second sign-post contains just one word, "Vecor". The full title is Vanderbijl Engineering Corporation, Limited, which has been established to manufacture heavy engineering equipment for steelworks, for the mines, and for other industrial and allied undertakings throughout South Africa. Years ago the necessity for an industry of this nature was recognized and the lack of it during the years of the war brought home to industrialists how vital a part heavy engineering was playing in modern life. The fact that it is now an established force in the industrial firmament of South Africa is due once again to H.J.'s courage and foresight.

This Corporation, whose nominal capital of two million is publicly subscribed, was registered in

February, 1945. With such enthusiasm did the officials entrusted with the task tackle the job, that within two and a half years, in spite of post-war reconstruction difficulties and delays in obtaining the necessary plant, the enormous machine shop, which itself covers over two acres of ground, came into full production. Here again, modern practice in England and America was closely investigated before any plant was ordered and manufacturing agreements were entered into with such well-known firms as Mesta Machine Company, the largest manufacturers of rolling mill plant in the world, Ashmore Benson, Pease, makers of blast furnace and other industrial plant, Associated Electrical Industries, Limited, and with Vickers Limited.

Some conception of the size of this concern (be it remembered, just one of H.J.'s many brain-children) can be gained from the fact that the works at present occupy an area of over one hundred acres, and a similar area has been set aside for future expansion. The present pay-roll

includes over eight hundred skilled and technical employees, and it is expected that in the reasonably near future the personnel employed will be between three and five thousand men and women.

It sounds so simple to say "the present payroll includes over 800 skilled employees," but every one of those employees had to be given accommodation for themselves and their families, so, in addition to building their works, H.J.'s young team entrusted with this job also had to solve the housing problem. Vecor Properties Company was formed, and this company took over the provision of homes for the workmen and staff. Contracts were placed with large-scale builders and houses designed which would provide the maximum comfort and convenience at a minimum cost. The results are amazing, and rows of neat bungalows line the streets, looking bleak and new now, but gradually becoming softened by the bright little gardens and the fast-growing trees.

Before the advent of this new industry, all heavy engineering plant and equipment had to be imported and the long delays in obtaining deliveries were proving a very real stumbling block to post-war industrial development. Now South Africa will be able to make its own steel-works and mining plant, not to mention a vast range of other engineering plant and equipment.

A million-volt X-ray plant is also to be installed to ensure that the enormous pieces of equipment manufactured by Vecor will be without hidden flaws. The intention is to make quite sure that Vecor's products will equal in price and quality those of any of the well-known overseas manufacturers.

So another milestone has been passed on South Africa's industrial highway and yet another source of employment and wealth for her people has been created.

Many private firms have also obtained land at Vanderbijl Park for future development. Several industrial concerns (overseas as well

as South African) are at present building their factories, while on the more domestic side are the usual shops, garages, etc., and designs are already under way for a large luxury hotel on the banks of the Vaal River in the Emfuleni Park, commanding a w lovely view of the river.

What a vista of opportunity this whole project opens up for South Africa - what a chance for our young architects, engineers and tradesmen to build for themselves a full and satisfactory life shaping the future.

When the plans for Vanderbijl Park were still in the embryo stage, Dr. van der Bijl said: "I shall probably not live to see the coming of the full realization of the ideals I cherish for this place, but when it comes I hope it will be a model, a place where people from the highest to the humblest can say, 'It is good to be alive'."

CHAPTER 10

VISIONS BEYOND THE COAST

“The South African people are descended from two great seafaring nations - the British and the Hollanders - we must make them shipping-minded once more.”

-H.J. v. D. B.

WITH such a heritage of seafaring in our blood, it is surprising that in the past few South Africans have turned to the sea for their livelihood. The answer is probably that the vastness of the development awaiting on land, left no time or inclination for expansion beyond the shores of South Africa. There was work and to spare for all, and excitement and adventure in plenty. When home-life became boring or too restricting, the sons of the early South African settlers had no need to run away to sea, for the undeveloped land around them was almost as vast and quite as packed with treasure and romance as the ocean itself.

With eyes dazzled by the glitter of diamonds and gold and with fortunes ready to be made - and lost - right here on the land, there seemed no good reason to turn again to the sea - that sea which had played so vital a role in the lives of our ancestors. However, the spirit of those old sailors who had toiled and suffered to open the sea lanes of the world, was far from dead, as was proved when the call came for men to defend our coastline during the war. The spirit of those South Africans who manned the little old whalers and shipping boats, when they forsook their peacetime trade for the tricky and dangerous job of mine-sweeping around the coast and submarine chasing, was the same old spirit that had guided our forefathers in their little sailing ships out over the distant horizon into the unknown. The descendants of the men who had conquered the Cape of Storms still had the vital spark of seafaring in their souls.

The cost of carrying passengers and cargo to and from South African ports, mounted ever

higher as the Union itself developed and today it runs into a figure of many millions of pounds annually. There was no reason why South African-owned shipping lines should not share in this big business, but there were so many other things to do on the land.

For many years Dr. van der Bijl had dreamed of building for South Africa a merchant marine service, but he, too, felt that there were other more pressing problems to be attended to first. Yet, in a corner of his brain, there was always an idea that one day he would be able to offer those young fellow countrymen of his who still had the sea in their blood, something more than a naval training on the “Botha”. He knew in his heart that one day his chance would come and he would be able to make possible sea-faring as a career under the South African flag. For well over thirty years this particular dream lay dormant, but the old file labelled “Shipping” in his study was always kept up-to-date with cuttings and articles on the progress of the world’s shipping business.

During the war the amazing repair jobs undertaken in South African ports gave him renewed hope and he felt that perhaps now he might be able to get started in the ship-building line. “Ship-building today,” he said, “is largely ship assembly,” and he planned to enlist the services of the engineering shops of the Witwatersrand and along the coast for the manufacture of pre-fabricated parts. The services of two Dutch engineers from Soerabaya were obtained, one a naval engineer and the other a naval architect. These men surveyed the South African coast for a possible site and recommended what they considered to be a suitable area in Durban. This land, however, belonged to the South African Railways and Harbours Administration, who were, unfortunately, not prepared to relinquish it. H.J. decided then not to press this development, for although he knew that the establishment of an industry of this nature was physically quite feasible and would be another fine investment in South Africa’s future development, he felt that the economic aspect

required very close investigation. By first of all establishing a South African merchant marine and encouraging repairs and alterations in South African ports, the shipping yards themselves would gradually expand until they were capable of undertaking any marine work required. From such beginnings, the step towards actual ship-building itself would be made much more easily and with less likelihood of financial risk.

When, towards the end of the war, it became evident that, at the close of hostilities, the American Government might be prepared to sell some of their war-time ships, H.J. felt that now perhaps was his chance. Busy as he was, he set to work to see if this was the opportunity he had been waiting for. The first requirement was, of course, capital and for the initial investigations H.J. and Mr. Henry Mercer, Founder and President of the States Marine Corporation of America, put up their own personal money and not until they were sure that the undertaking could be a financial

success did H.J. set to work to raise the additional capital required to purchase the ships and start things moving. The South African Marine Corporation was duly registered in December, 1946, with an initial capital of £1,000,000.

An agreement was entered into with Mr. Mercer's Company, the States Marine Corporation of America, one of the biggest and most successful shipping lines in the United States, and in this way the new little South African Marine Corporation found for itself a big brother and the experience and advice of the old established firm was made freely available to the new Company. The naval engineers and officials of the States Marine Corporation with their vast experience of all the ramifications of the shipping business, gave invaluable service, not only for the most important initial job of selecting the best ships available and of re-designing them for their new careers, but also in assisting to overcome the thousand and one

difficulties inseparably connected with the starting up of a new line.

The South African Marine Corporation acts as agents for the older company in South Africa, while the States Marine Corporation handles all business at the American end.

In England, the large British shipping company of Sir William Reardon Smith & Sons, freely offered their advice and assistance in the important matters affecting insurance, arrangements for the establishment of seamen's clubs and hostels and a host of other details so necessary if a success were to be made of the new venture.

In spite of its overseas contacts, however, the South African Marine Corporation is purely a South African controlled shipping company backed by South African capital, manned and managed as far as possible by South Africans, and its ships are registered under the South African flag. It neither sought nor required Government assistance or subsidy.

As a start, three ships were purchased and are now in service carrying full loads of cargoes and passengers to and from the Union and America, and it is hoped that very soon ships of the South African Marine Corporation will be carrying the Union flag into many foreign ports.

It would seem that the month of August is a propitious one for Dr. van der Bijl. August brought him the fulfilment of his dream for a son and, on the 22nd August only four years later, his first ship, "The Constantia," sailed into Cape Town harbour. "The Constantia" was the first of the three ships now in commission - they are all sister ships and are named after famous old Cape Dutch homesteads. "The Morgenster" and the "Vergelegen" were to follow within a very short time, but "The Constantia" was the first, and what a welcome awaited her. How proud H.J. must have been as he watched her come slowly in. Proud and grateful, for once again the Fates had been kind and another dream - an

old, old dream - was coming true. In the shadow of Table Mountain, guardian of this land of his, this South Africa for whose welfare he had worked and would continue to work and strive, he watched the fifteen thousand-ton vessel come "home". Her past life as a troop carrier under the name of the "New Bern Victory" was over. Her quarters for nearly three thousand troops and all the attendant wartime fitments - guns, armour plating, hospitals, operating theatres and the hundred and one necessities for her old job, had disappeared and she had been transformed into a modern passenger and cargo ship, with ultra-modern cabin accommodation for her passengers and up-to-date quarters for her crew, with spacious holds and cargo hatches and modern lifting gear capable of handling up to thirty tons on one derrick. Here she was at last with her new South African name, ready to start a new life and open up yet another avenue of employment and wealth for the people of South Africa. This was indeed a very satisfactory culmination of the months of negotia-

tions, organization and effort that had been put into making a dream come true.

It is easy to imagine the work involved in forming the new company, raising the capital, finding the right men to do the job-and once again H.J.'s "luck" held and he found keen and willing helpers for this new task. There were contacts to be made, agreements to be negotiated and cargoes to be sought. The purchase of the ships themselves required careful thought and investigation, then came the big job of transforming them from ex-troop carriers to modern passenger and cargo ships. The American Government would not sell the trooping equipment with the ships, so all the war-time fitments had to be removed under bond. The deep fuel tanks designed for long-range duty in the Pacific were opened up for general cargo. Heavy lifting gear was installed and the cargo holds re-designed. The ballasting arrangements had to be completely altered and the thousands of tons of permanent ballast removed. The three ships purchased had all

been heavily armed and armour plated, with something like twelve gun positions. All this had to be removed, and fortunately the remodelling was economically possible and worth while, for the ships were ideal for the purpose for which the South African Marine Corporation wished to use them. For one thing, with their displacement tonnages of over fifteen thousand tons, the ships were all excellent dead-weight carriers and particularly suitable for the purpose of carrying ore-their main outward cargo.

One can imagine how H.J. and his party who boarded "The Constantia" at Cape Town and shared her maiden voyage around the South African coast to Durban, must have enjoyed their voyage. The joy of fulfilment is very sweet and to this was added the luxury and comfort provided by the well-designed and modern passenger accommodation. The officials who had been entrusted with the refitment of the ships had certainly seen to it that everything was as comfortable and up-to-

date as possible. Now H.J. was able to test for himself the full value of the transformation.

Only a limited number of passengers are carried on each ship, as the main business of the line is cargo, so the state-rooms could be made as luxurious and comfortable as possible. They are all air-conditioned and during the day the beds, by merely turning a handle, become comfortable leather-covered couches. There are deep armchairs, cupboards and electric plugs for ironing and for electric razors. Each state-room has its own private bathroom.

The navigational equipment is of the latest with Sperry gyro compasses, long and short-wave radio apparatus and radar equipment. The ship's laundry is fully equipped with electric washing machines and generous refrigeration space has been provided for both passengers and crew. Each ship has an electric cow, which produces a delicious pasteurised milk from sweet butter and whey powder.

All this, of course, is only a small beginning, and H.J.'s usual far-reaching conceptions envisage a large fleet of ships carrying the South African flag to far distant ports. In the meantime the route is between the United States of America and South Africa - Cape Town, Port Elizabeth, Durban, and then to Lourenco Marques. Perhaps one day, too, in the not far distant future, South African ship-builders will be busy building the new ships of the line.

It is interesting to read with what interest the United States Government watched the establishment of the South African Marine Corporation and how it welcomed the link thus formed between the two countries. To commemorate the inauguration of the service, the United States Post Office Department issued an envelope specially designed for the occasion. In the top left-hand corner of this envelope are printed the words:

“Commemorating the inauguration of service by South African Flag Vessels between the

United States of America and South African and East African Ports.”

Then follows a reproduction of “The Constancia” linking the two countries, represented by small relief maps.

The first letter H.J. received in one of these envelopes was sent to him by Mr. Elkan Turk. It reads:

Dear Doctor van der Bijl,

You will find this letter enclosed in one of the envelopes bearing the cachet made up by the United States Post Office Department to commemorate the inauguration of service by South African Flag Vessels between the United States of America and South and East African ports.

I suppose that in the course of time this envelope will become somewhat of a collector's item.

With best wishes,

I am,

Sincerely yours,

Elkan Turk.

CHAPTER 11 FOOTPRINTS

*“Lives of great men all remind us,
We can make our lives sublime
And, departing, leave behind us
Footprints on the sands of time.”*

LONGFELLOW.

THE “footprints” Dr. van der Bijl is leaving on the industrial soil of South Africa are many. They are firm and deep and should endure as a lasting example of what the enthusiasm and inspiration of one man can do to improve the lot of his fellow men. Many a young South African will surely “take heart again” and carry on with renewed inspiration as he thinks of the record of achievement of this fellow countryman who obtained in one short lifetime a front-line place in three separate careers - Scientist, Engineer and Industrialist.

It would be almost impossible to calculate the number of South African families who have

benefited directly or indirectly from his work, not only in direct employment, although the number of men and women, European and non-European, employed in the industries he has created, grows daily, but also in many other important directions. Working under agreeable and hygienic conditions and living in well-designed and comfortable homes, in pleasant surroundings, is only one aspect. There are also all the young engineers, architects and executives who have been given priceless opportunities to prove their worth. All those many young South Africans he has sent overseas to study at close quarters the methods applied in other countries who have returned more mature and wiser to apply their new-found knowledge to South African development, must bring back with them a new breadth of vision, a different perspective, making them better citizens and an asset to their country.

The trained craftsmen and their families brought to the Union to man new sections of

industry, bring not only much-needed manpower, but, in passing on their knowledge of their craft to young South African apprentices, are building up a future supply of technical skill, the importance of which it would be difficult to over-estimate.

In Europe and America, Dr. van der Bijl's achievements are well known and appreciated. Quite apart from his early scientific research work in Germany and America, with its worldwide repercussions, his advice and opinions are now sought by industrialists and business men in all parts of the world. Leading men in overseas industries will make long journeys for the benefit of a short discussion with him, and the catholicity of the correspondence that passes over his desk is amazing.

In 1946, the Prime Minister of England, Mr. Clement Attlee, through General Smuts, invited Dr. van der Bijl to come to London to use his influence in settling the deadlock which had arisen between the Government and the British Federation of Steel Manufacturers on

the question of the nationalization of the British iron and steel industry. It says a good deal for his tact and ability to handle difficult situations and of his reputation in England, that he was able to make any headway at all. For years he had been in close touch with the leaders of the British Steel Federation, men who had always been willing to give him their friendship, assistance and advice. These were his friends of long standing and, in coming over at the invitation of the British Government, it must have appeared to them that he was going over to the enemy, although they knew that his integrity and fairness were beyond reproach.

At the time, negotiations between the British Government and the Steel Federation had completely broken down, but H.J. was able to talk the language of both sides - he knew from experience both the advantages and dangers of State control, just as he also knew from experience the advantages, difficulties and overlapping of private enterprise. Within a

week of his arrival in London he was able to arrange a meeting with representatives of both sides and his report, which unfortunately is still confidential, was accepted in full. One of his suggestions that a Board of Steel Control should be formed representing both sides, was put into immediate effect. This Board of Control had powers to control the reorganization of the British steel industry during a trial period before any final decisions were arrived at. This gave the private industrialists time to prove their worth and the British Government time to watch and wait without causing an immediate revolution in so large and vital an industry as the iron and steel industry. The whole question was fraught with difficulties, for a wrong decision might upset the whole fabric of British industry and so retard recovery almost indefinitely. An economic structure so vast was a most intricate affair and needed careful handling if the repercussions were not to be disastrous.

The British authorities unanimously decided that Dr. van der Bijl was the man to run their newly formed Control Board, and immediately offered him the chairmanship of the Board, but his heart was here in South Africa where there was still so much to be done and, although deeply honoured by this show of confidence in him, he declined the appointment and returned to the Union.

So far, this book has been mainly an impersonal story of the development of the industrial life of the Union of South Africa and of the man who has been its mainspring and driving force. It may seem to many a record of almost unbelievable achievement and the criticism may well be made that, being too near to the events related, has distorted the author's view. It is, however, essentially a faithful recording of facts substantiated by numerous documents, newspaper articles and cuttings, papers, speeches and addresses made by Dr. van der Bijl himself and from his old notebooks and diaries. There has been no exaggeration, no

juggling of dates and acts to make wisdom after the event appear as foresight - figures, facts and dates are faithfully given in their correct sequence in every instance.

But what of the personality that has made all this possible? That is a very much more difficult task, for H.J. fits no preconceived idea of the successful business man. He is no aloof superman - no noble idealist living in an ivory tower of pure practical reason. His is a complex character, deceptively simple. He is home-loving with few mannerisms and no fads. His tastes are simple, and ostentation of any kind irritates him. Like all parents, he is proud to the point of boredom, of his three children, but quite prepared to become annoyed with them when their demanding noisiness gets on his nerves or little fingers cause the disappearance of keys, pads, pencils, rulers, scissors and such-like treasures to small magpies. He is very positive in his opinions, which have an annoying habit of turning out to be correct, and has a speed of thought and decision which is

rather terrifying and upsetting to less bold spirits.

His hobbies are many and varied. Photography and home movies give him keen pleasure, and some of his cine films in colour are really excellent. Stamp-collecting, gardening, boating and fishing all have had their day. Official banquets bore him to death, but he has a boy's enjoyment of a good party or dance - especially if there are plenty of good jokes and some "vastrap" music. His earlier love of tennis has been ousted by the much more annoying game of golf and when, without reason, his usual steady game goes to pieces he shares the normal golfer's handicap of having an inadequate vocabulary to express his feelings. He greatly enjoys his usual Sunday morning swim with his children in the home swimming pool, interspersed with a game of bowls or putting on the greens in the garden.

Shunning the limelight, he is seldom found at fashionable functions. His time is too precious, for in spite of his many commitments, he

always finds time to see his “own people” and to discuss and solve with them any problems or difficulties which may arise.

Many leading South Africans foresee a political future for him, but it is very doubtful if he will ever abandon his industrial schemes to enter party politics. Yet, who can tell? The future of South Africa is his main interest and whatever decision he may make will be dependent on the greatest good he can do for that future. He certainly has no political aspirations whatever and it would be difficult to classify his political outlook in terms of party politics.

His belief in the efficacy of non-profit-making utility companies has often led to his being asked the question whether or not he believes in socialism. His opinions on this question can best be given in his own words, recorded in a suffers from. What that root cause is and whether it can be removed or not, are questions I would not care to answer. But I do believe that the world is steadily progressing along a line of socialization that will at least have the effect of

minimizing the results of whatever that root cause may be, and the progress will be sound as long as we do not stifle human initiative and remember that people are not all alike in common sense, skill, creative power - in brain capacity - and that, therefore, the standards of living of different people will always be different. The best that can be hoped for is a more equitable difference between these standards.

“It has often been brought to my notice that the success of Escom indicates that several other activities should be run on the same lines - ‘Escomized,’ so to speak. But, there again, one has to be very careful not to tamper with the economic machine.”

Here the reporter asked what further activities H.J. considered might be turned into public utility corporations along the lines of the Electricity Supply Commission.

“Well, now,” H.J. replied, “activities which I can imagine as being ‘Escomized’ are those that

can be classed as public utilities, provided we leave ourselves free to broaden the definition of 'public utility' in the course of years, perhaps in the course of generations - activities being brought within that definition gradually and only with the evolution of thought.

"It is possible that the definition 'public utility' may yet be widened to include not only essential services, but also non-creative activities. Today, the definition admittedly includes, *inter alia*: water supply, sanitation, electricity supply, transportation, uneconomic housing and intelligence communication. But it is not inconceivable that the definition of 'public utility' may in time also include such activities as medical service, distribution of foodstuffs and of other necessities. The definition may, in time, include even more than these.

"It is only a relatively small step that separates, for example, transportation from distribution of foodstuffs. This may seem startling because of our innate abhorrence of any change in the

order of things, although we tacitly and, perhaps unwillingly, admit that changes must come.

"But as long as we adhere to the principle that such changes must come only by guided evolution there is no need to fear, because history has taught us that every generation unconsciously adapts itself to its own environment, so that when these changes do come they may not seem particularly out of place."

"There is, however," he continued, "a great difference between State Socialization and what one may call 'Escomization'. When the constitution of the Electricity Supply Commission was drawn up in 1922, it enunciated a new principle in that it provided for administration solely for the benefit of the public, but entirely on business lines. At that time it looked like merely the enunciation of a new principle, but now we know that it was the birth of something real, something that may yet have a profound influence in shaping the things to come for a

social structure in which the world can take greater pride.

“Before this can evolve, however, I can see the need for extensive amendments to the world’s democratic constitutions, so as to give democracy a better chance.

“I do not believe in dictatorship, because it might too easily lead to jeopardizing the destiny of millions of human beings. In South Africa, of course, the people will not tolerate such a thing.

“The best that can be said of dictatorship is that it has in some cases resulted in more expeditious material development. But the same can undoubtedly be achieved by democracy more suitably constituted. I do not see why it should not be possible to form a democratic constitution that will enable a country to be run more like a business concern.”

Although it is more than ten years since H.J. gave this statement of his views, he would probably have little different to say in answer to the same question today, for it sums up his

outlook very clearly and is an expression of the two fundamental principles of his life: that “the greatest and noblest function of science and engineering is to raise the standard of living of the human being”, and the motto on his family coat of arms, which reads: *Festina lente*, hasten slowly.

In 1942, in a speech to the Navy League, he stressed the importance of South Africa playing her part in keeping open the sea lanes of the world and of the importance and advantage to South Africa of being an equal partner in the British Commonwealth of Nations. Being a member of this great Commonwealth of Nations, he maintained, enables South Africa to enjoy an independence much greater than the old Transvaal and Free State Republics ever dreamed of, and also enabled South Africa to develop economically in a way that otherwise would have been impossible. In this address he stressed the similarities of outlook of the British Commonwealth and the United States of America. In spite of superficial differences, the

fundamental conception of life is the same and, he believed, that a combination of these two great democracies could be the greatest force for good that the world had ever known. He reiterated his firm belief that whatever setbacks there might be to our present civilization, that civilization would not perish.

In this same address, he referred to the redistribution of population which would inevitably follow the conclusion of the war, and hoped that South Africa would receive her share of immigrants for, he added, "I think we need more people and less politics in the Union". As always, he stressed his view that "it is not the Government's function to do everything for its people, but that it is its duty to create conditions that will encourage enterprise - not the type of enterprise that results in the unfair enrichment of some at the expense of others, but enterprise that results in equitable distribution of all the benefits.

Unfortunately it has been impossible to mention any of H.J.'s helpers by name. There

are far too many who have given of their very best, given freely of their loyalty, ideas and devotion to the progress of his plans. From the few men working in daily close contact with him and sharing the heavy burden he carries, down to the humblest clerk, all have played their part and it would be unfair to mention one without listing all - an impossible task.

In answer to the frequent question how he has been able to accomplish so much, H.J. invariably replies, "because of the men I have had to help me." He will then go on to explain his "fundamental principle of business organization" which is that the utmost care must be exercised in selecting the right man for the job to be done, then that man must be given authority commensurate with his responsibility. It is no use, in his opinion, asking a man to do a job and then tying his hands with petty restrictions. If you cannot trust him to do the right thing, don't give him the job to do. Better always the sin of commission than the sin of omission. Even mistakes have value in his

eyes, for, as he has always said, a man must have a reason for making a particular mistake and it is by trial and error that we learn and grow. He always consoles his young executives who come to him with their troubles by saying: "there is nothing that cannot be put right, but tell me why you acted in this way," and as a parting shot they will be warned: "Now, remember, only a donkey bumps his head against the same wall twice."

He also believes that in building up a sound future for South Africa, every man must do his share. Just recently he said: "Many people appear to be under the impression that efficiency consists totally of getting artisans to do more work, but, in my opinion, the work of the artisan is only one factor in the efficiency complex. The three component parts of efficiency are:

- (1) Sound and intelligent management.
- (2) Honest and co-operative labour.
- (3) Modern and up-to-date equipment.

Our future is bright, our opportunities lie ahead - let us be worthy of them."

One leading British scientist and engineer who has had profound experience working with the big men of the world, recently told us that H.J. was quite unique in his experience. He went on to explain that whereas most clever men know exactly what they want and know the whole plan in their own minds, they frequently have difficulty in communicating their ideas to others. H.J. has the unusual gift of being able to share his vision of the future and of pointing the way so clearly that his helpers can go ahead with only occasional prompting and help. This particular engineer was chaffing a group of young men and accusing them of taking H.J. too much for granted. "Yes," he said, "you all think you are mighty smart fellows, but I wonder how you would get along without this remarkable source of inspiration behind you." It is good to think that far from being insulted, the young people in question

were highly delighted with the compliment paid to their leader.

Perhaps one of the secrets of H.J.'s success is that he has never lost his desire to learn. He is always ready to hear the other fellow's point of view and values constructive advice. He said recently: "The wise man is usually reluctant to express his opinions in public - which is a pity, for we need his views - not so much for the purpose of developing at a greater rate, but to help us to make sure that we all keep on the right track. The rate of development of South Africa is a source of amazement even to Americans, and I think we are travelling as fast as we dare without losing control of the car, for we are not travelling on a tarred road."

Criticism does not bother him unduly and a recent quotation in a newspaper appealed to him enormously. It read: "If you would avoid criticism, do nothing, say nothing and be nothing."

He has an intense loyalty and bears no grudges. He has remained faithful to his ideal to make possible for South Africa a bright industrial future which he is convinced is the only sure way of bettering the living conditions of her people, and nothing else matters very much to him.

When in December, 1941, death claimed one of his staunchest friends and helpers. Mr. A. C. McColm, who, at the time, was General Manager of Iscor and Deputy Director-General of Supplies, H.J. said of him:

"His endeavours to help South Africa have been indefatigable in the face of many difficulties. He never spared himself. His thoughts dwelt in a sphere where there was no room for pettiness, they were elated, impersonal and, coupled with these characteristics of a great man, was the meticulous care with which he was always ready to give a helping hand to others to the exclusion of any consideration of himself or

his own welfare. He never wore a mask. He had no enemies.”

No wonder these two men were such firm friends and worked together so well, pooling their great gifts for the benefit of their country, for their outlook and ideals were the same.

All this, of course, does not mean that every man H.J. happens to meet admires or agrees with him. He is far too positive a character not to cause “sparks.” Envy is, after all, a common human failing and there are men whose path he has crossed and many who neither understand nor like his cold reasoning, but of his personal integrity and the honesty of his purpose, there is no doubt whatever.

Here, then, South Africa, is the story of your heritage - a story that can only be partly told, for it is still unfolding, and there are many dreams, schemes and plans in the fertile brain of this fellow-countryman of yours. It is a heritage

handed to you freely as a gift, with no thought of personal gain, no demands on your affection or esteem. You inherit freely the life work of a great South African.